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incorporating Food Industries Weekly

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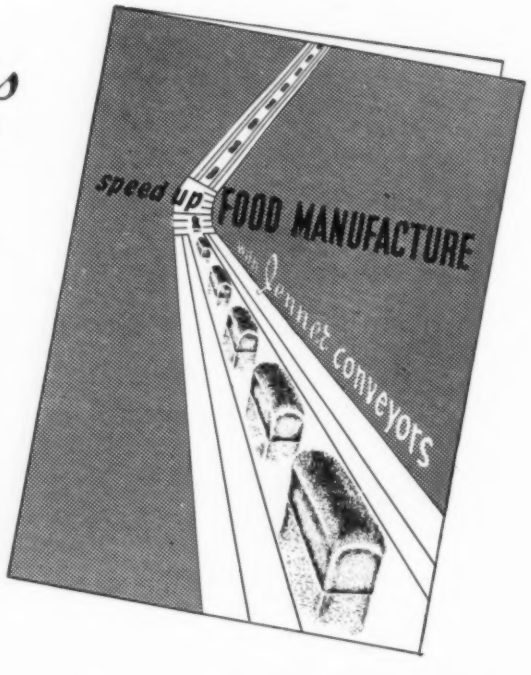

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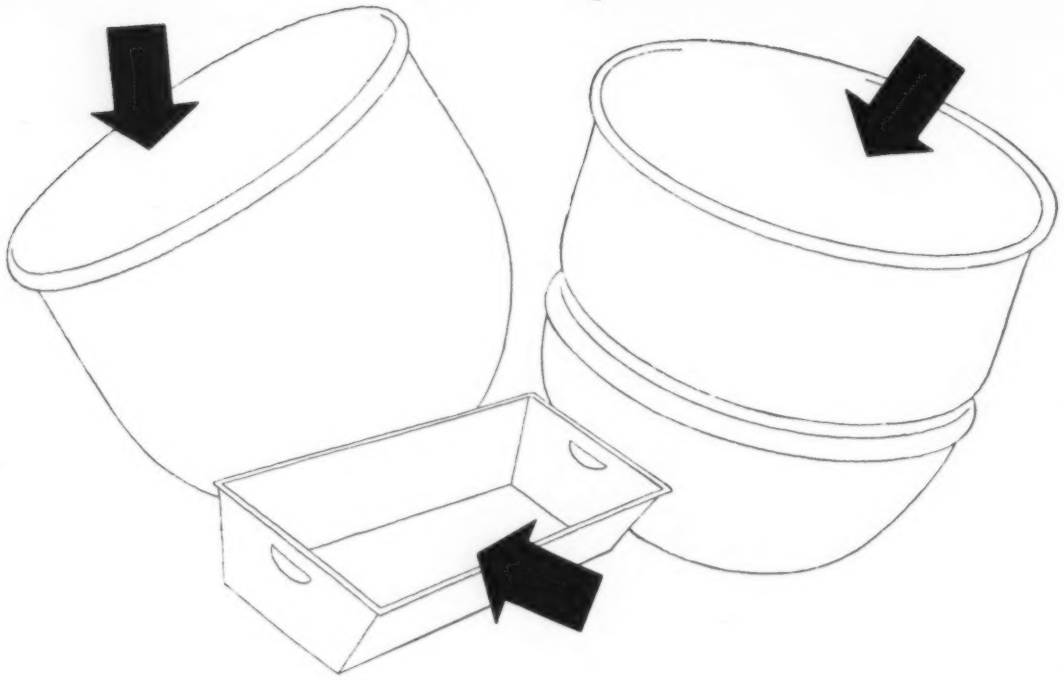

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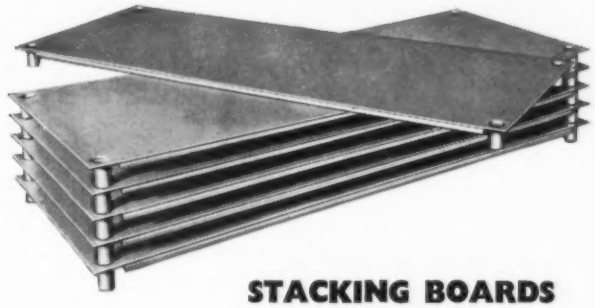

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- ★ Duo-servo brakes in large drums have braking area of over 200 sq. ins.
- ★ Well sprung and amply tyred.
- ★ Very complete equipment.

A PRODUCT OF THE ROOTES GROUP

COMMER CARS LTD. LUTON BEDFORDSHIRE

Vessels for Food Processing

STAINLESS STEEL — MONEL METAL — ALUMINIUM

The vessels illustrated are from our range of

"STANDARD LINES"

We can offer early delivery at competitive prices for these units, either 50 or 100 gallons capacity with or without castors.

Larger sizes up to 5,000 gallons

MADE TO SUIT YOUR REQUIREMENTS

Our wide and varied experience

of

STAINLESS STEEL

MONEL-METAL

ALUMINIUM

FOR THE MANUFACTURE OF

FABRICATED INDUSTRIAL PLANT

is at your service

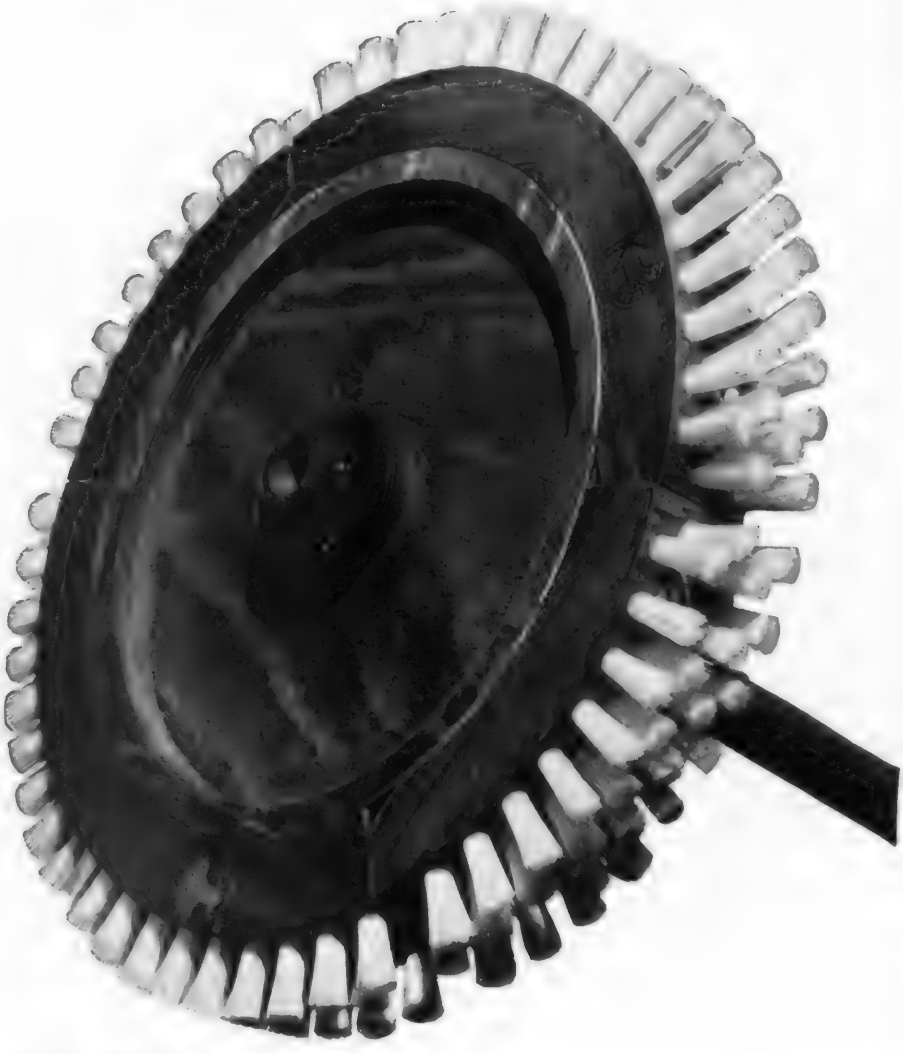
We shall be very glad to send one of our Technical Staff to discuss your particular needs.

Stainless Steel Vessels (London) Ltd.

WORKS: MANORGATE ROAD, KINGSTON-ON-THAMES, SURREY

Telephone: KINGSTON 5625 (5 lines). Telegrams/Cables: ESESVESSEL, KINGSTON-ON-THAMES

SPECIALISTS IN THE FABRICATION OF INDUSTRIAL PLANT



FOOD FACTORIES must be SPOTLESS

The highest standard of cleanliness is essential in food processing plants; that is why H. J. Heinz Co. Ltd. chose this "Kleen-E-Ze" nylon-tufted brush for duct-cleaning.

ICI

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P.N.89

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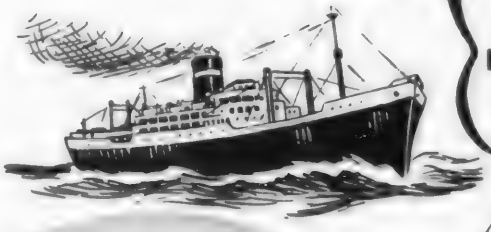

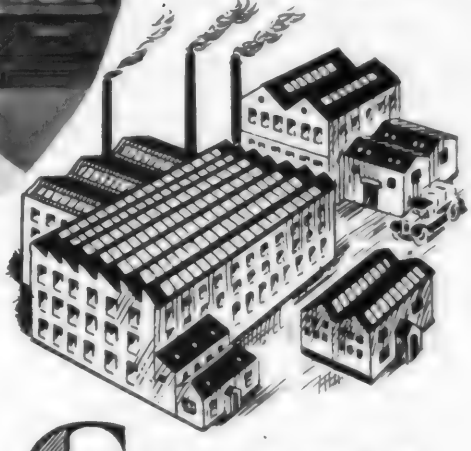

STRICT TECHNICAL CONTROL ENSURES UNVARYING ADHERENCE TO ARRANGED STANDARDS OF MUCILAGE

Nothing is left undone to ensure that the gums we supply maintain with exactitude the standards of mucilage required by our customers.
All grades of our powdered gums are guaranteed pure and to conform to the requirements of the Food & Drugs Act and British Pharmacopœia.

Samples on application.

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The UNITED INDIGO *and* CHEMICAL COMPANY LTD.

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(AND IT'S A VERY BIG IF)

.... if you can discover—anywhere—a better-value-for-money Service Cabinet than Prestcold SC.153 — tell us about it. The Prestcold SC.153 incorporates all the finest features and equipment, all the strength of construction, all the excellence of design and finish you would expect in a product of the largest manufacturers of automatic refrigerators in Britain. Yet the price is only £155. **Your local Prestcold distributor will be glad to demonstrate it to you — or full details will be supplied on request.**

PRESTCOLD

SERVICE CABINET SC 153

15 cu. ft. — £155

DELIVERED & INSTALLED ENGLAND & WALES

LARGER MODELS AVAILABLE

PRODUCT OF PRESSED STEEL CO. LTD. COWLEY, OXFORD

the 'Edicol' palette

of colours for sugar confectionery

Connoisseurs of confectionery as schoolgirls undoubtedly are, they are by no means alone in their readiness to respond to a subtle use of colour. 'Edicol' Colours, from first to last, are made with scrupulous care. Stable to normal processing conditions, they appeal with delectably delicate hues not only to schoolgirls but also—perhaps unfortunately for them !—to all the rest of their families.

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For further information please write to your nearest I.C.I. Sales Office

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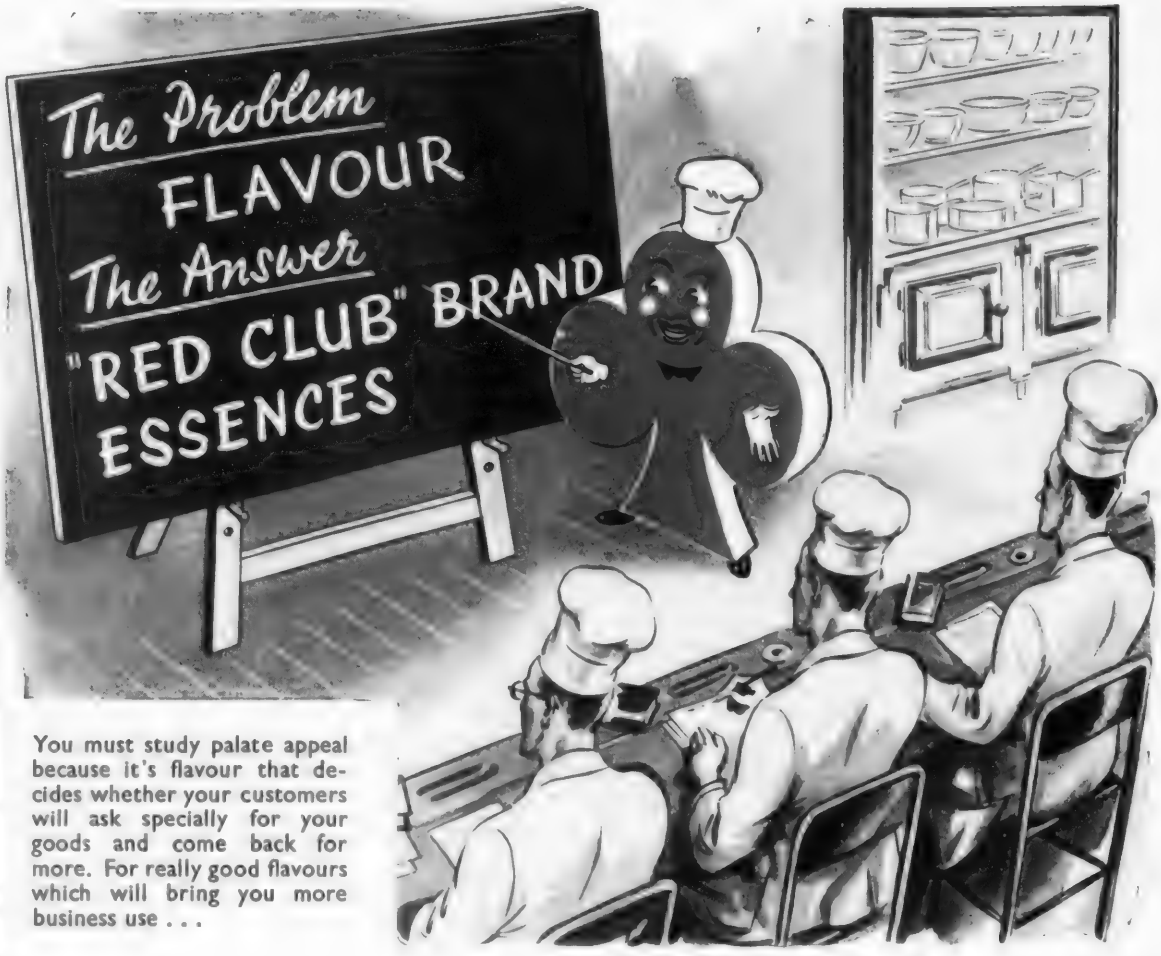

You must study palate appeal because it's flavour that decides whether your customers will ask specially for your goods and come back for more. For really good flavours which will bring you more business use . . .

"RED CLUB" Brand

Essences, Essential Oils, Butter Flavour, etc.

for all Food Products

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ESTABLISHED IN THE YEAR 1858

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Stainless Steel FABRICATION

Newmans have the experience, the facilities and the specialised craftsmen necessary to undertake all types of fabrication in Stainless Steel to customer's requirements. Our advice and services are at your disposal—may we have your enquiries?

NEWMAN INDUSTRIES LIMITED, STAINLESS STEEL FABRICATION DIVISION, YATE, BRISTOL

Cogent

How should an adhesive **REACT TO MOISTURE?**

What kind of moisture? Bathroom condensate... transport humidity... quick-freeze dew formation... mildew damp... or merely tongue-wetting to seal an envelope? An adhesive must either resist moisture or respond to moisture. To what degree? That depends upon the product's final use. And the degree of reaction affects the adhesive formulation. For in addition to its major function of adhesion, an adhesive must be able to withstand all normal or unusual conditions of use. It must protect the seller's product by keeping it tightly sealed in its container... maintain the product's identity by keeping it permanently labelled... or fulfil the product's function by reactivating to moisture for final adhesion.

Adhesive formulation is a task for a specialist. It requires a complete knowledge of the surface factors, application methods and field conditions that determine the final sales protection an adhesive can give to your product. National is an adhesive specialist. We're ready to help you—NOW.

National ADHESIVES

NATIONAL ADHESIVES LIMITED
(Dept. B SLOUGH, BUCKS. TEL.: SLOUGH 23344

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

N.A.A.3

Sound ripe fruit, rich in vitamins and sunshine, deserves every care in preserving. Leading jam-makers ensure this by using Elpex, the natural Apple Pectin which achieves a firm set without excessive boiling, leaving the colour, flavour and texture of the fruit unimpaired. The jel-making qualities of Elpex never vary; every batch is tested before dispatch. Enquiries are invited from holders of M. of F. permits.
Elpex
APPLE PECTIN
WILLIAM EVANS &
LTD.

Let them SEE what you pack!

The time is not yet here when we can supply *everyone* with *all* their needs. Raw material shortages will continue to curtail deliveries, *so make the most of available supplies.* Within current limitations we do our best and will continue to allocate production fairly among our many customers. In the meantime we urge all users to speed up the recovery of returnable containers.

milk

Protect the flavour and appearance of your product and deliver in glass. *The* economical method of delivery.

beers and minerals

U.G.B. Beer and Mineral series spell accurate capacity, long life and maximum trippage.

preserves

The universally popular and now improved Kilner Jar used in home bottling.

food containers

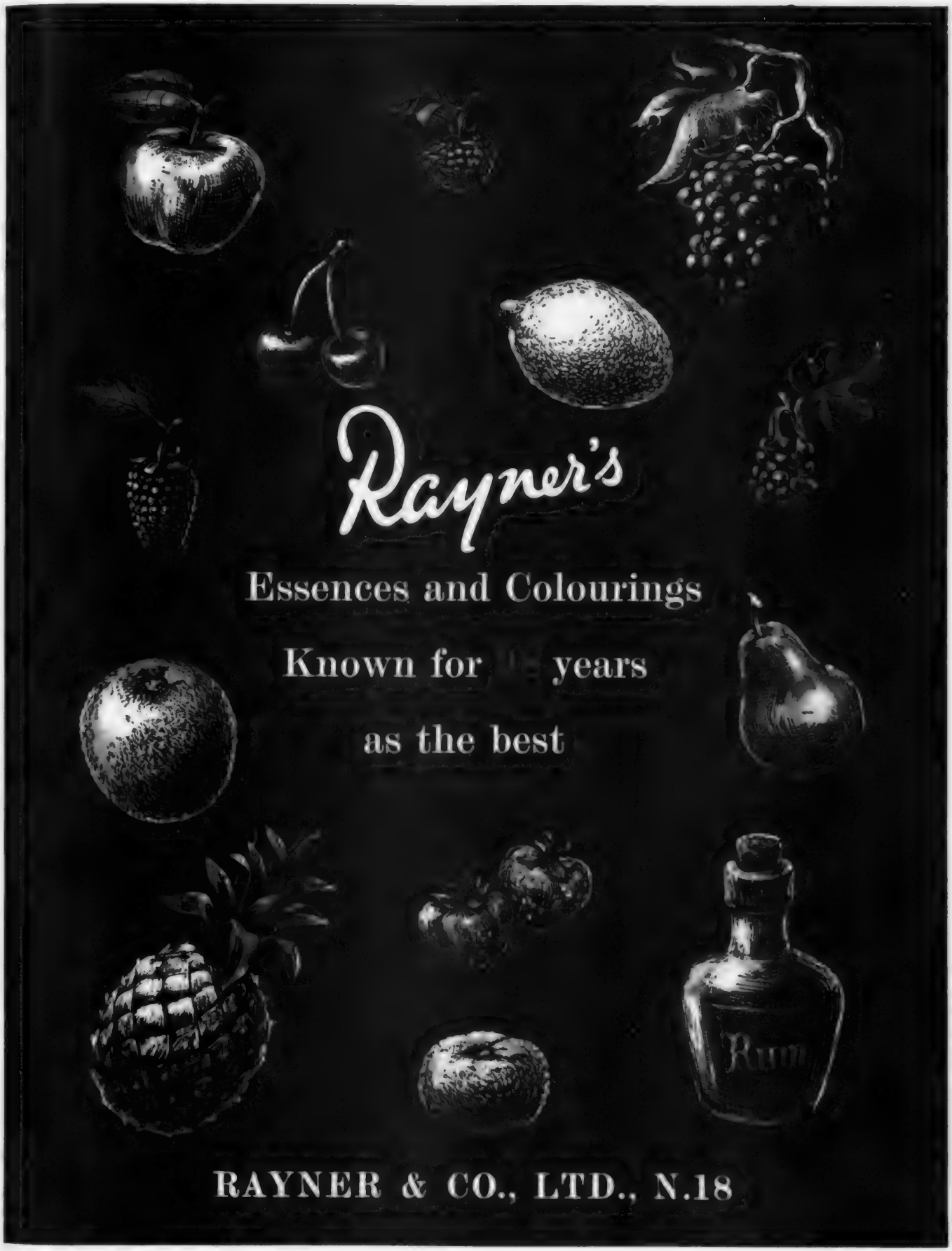
Over a wide range of other foodstuffs it pays to pack and present in glass. Preferably and when available, in U.G.B. Glass.

UGB

UNITED GLASS BOTTLE MANUFACTURERS LTD.

8 LEICESTER STREET, W.C.2

Tel.: GERRARD 8811 (15 Lines) Grams: UNGLABOMAN, LESQUARE, LONDON


Rayner's
Essences and Colourings
Known for 50 years
as the best
Rum
RAYNER & CO., LTD., N.18

Delivery end of a recent extended model Type 10 J.J. for washing, de-labelling, rinsing and sterilizing biscuit tins. By courtesy of Messrs. McFarlane, Lang & Co. Ltd., Glasgow.

10,000 TINS IN 8 HOURS . . .

cleaned by **4** girls

and **one** Kellie continuous washer

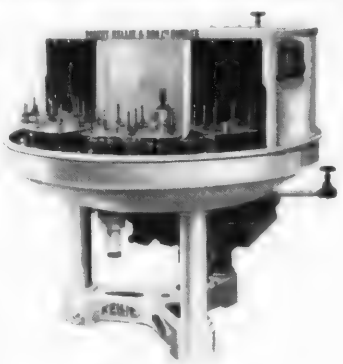
Leading Food Manufacturers reduce production costs and floor space by washing and sterilizing all shapes and sizes of biscuit tins and lids, jars, bottles, bowls and other containers, bakers' boards, trays and racks, confectionery, ice cream, chocolate and meat moulds, pear-shaped ham containers in KELLIE'S LATEST HYDRO-ELECTRIC CONTINUOUS WASHING MACHINE. Patent automatic label extraction and simultaneous filtration of re-circulated solutions eliminates pulping, permits long-spell working without sparge pipe cleaning or solution renewal and eliminates waste. Kellie unit-construction bars machine-rust and corrosion. Machines will be designed to give *your* desired output.

EXAMINE THESE FIGURES

Washing time.	Tins per hour.	7-hour day on tins.	1-hour day on lids.	8-hour day output, allowing 10% lost time.
10 mins.	744	5208	5616	4688 tins and lids.
*7½ ,,	992	6944	7488	6250 ,, ,,
*5 ,,	1488	10416	11232	9375 ,, ,,
4 ,,	1860	13020	14040	11718 ,, ,,
3 ,,	2480	17360	18720	15624 ,, ,,

* Standard washing periods.

Type 10 J.J. Machine can be combined with a draining and drying unit.



Kellie Continuous Rotary Automatic Washer, Rinser & Sterilizer Type 6 J.J. for jars and bottles of most shapes and sizes from 1 ounce to 1 gallon. 36 per minute handled by one operator, 72 by two.

KELLIE for FOOD PLANT

Send for full particulars to

ROBERT KELLIE & SON LIMITED

DUNDEE · SCOTLAND

Telephone:
2819 Dundee (2 lines)

Telegraphic & Cable Address:
"KELLIE" Dundee, Code A.B.C. (5th Edition)

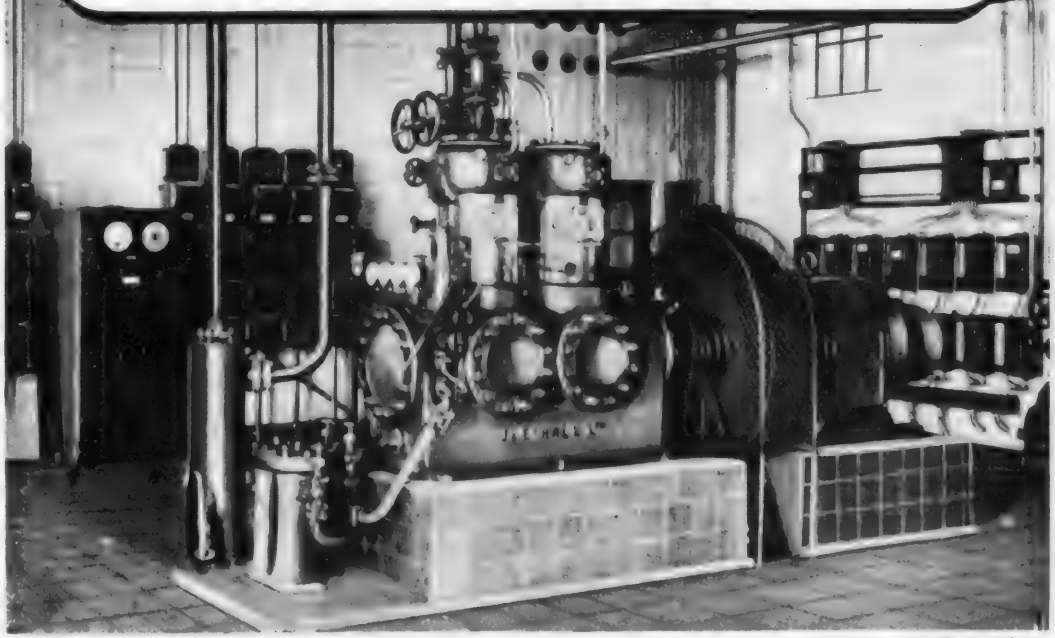
REFRIGERATING PLANT FOR DAIRIES

Refrigerating plant by J. & E. Hall Ltd. is widely used throughout the milk industry. The illustrations show a Hallmark automatic milk cooling plant suitable for a dairy farm and a large ammonia compressor of a type used for milk cooling on the largest scale. J. & E. Hall Ltd. have extensive experience of the refrigeration requirements of other sections of the food industry for which they have supplied many plants, including a number of installations both large and small for the rapidly developing quick freezing industry.

J. & E. HALL

LIMITED

DARTFORD · KENT · ENGLAND



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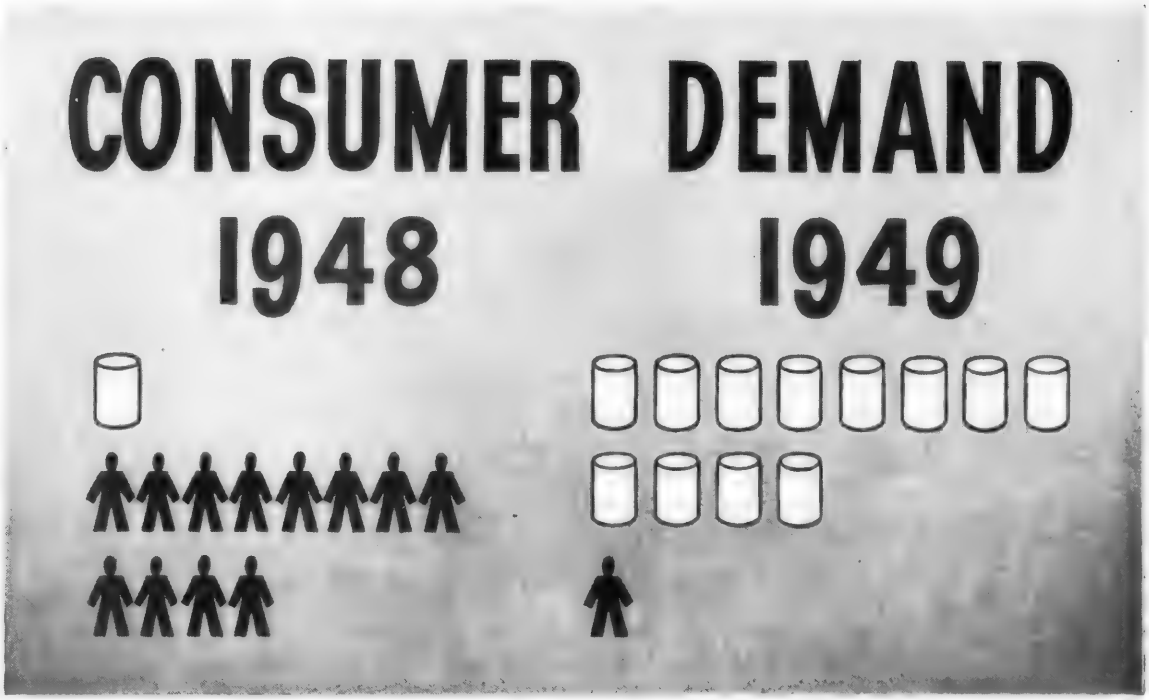


QUALITY PRODUCTS with *Protex*

The Market has changed! Every Food Manufacturer has felt this and is improving his pack and increasing his sales promotion. The wise manufacturer is also looking to his recipe. To-day only Quality products will sell and the finding of that extra something to appeal to every palate is no easy matter.

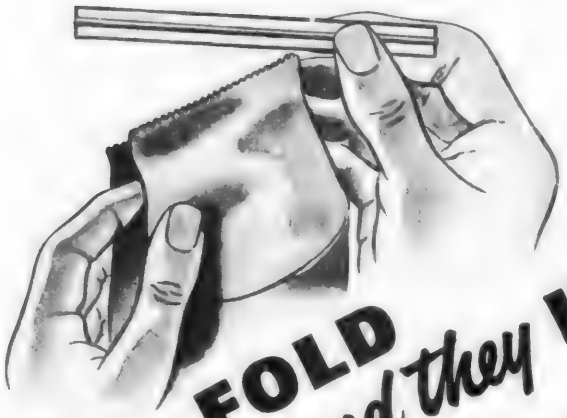
Many manufacturers have known the secret and added PROTEX to their recipe. The demand for PROTEX increases steadily. For PROTEX is a concentrated hydrolised protein which brings out all the hidden flavours of your ingredients. Its appetising flavour ensures that extra zest which marks the quality of one product against another.

PROTEX should be used for improving all Soups, Stews, Bouillon Cubes, Pastes and similar preparations. Why not ask for full details now?

FREDK. BOEHM LTD., 19, BENTINCK STREET, LONDON, W.1.

Always a good 'turn out'
thanks to
SUPER ZINNATINE
FOR FRUITS
SUPER SULFATINE
FOR VEGETABLES
ZINNATINE MARINA
HOLDEN'S
THE PIONEER LACQUER MANUFACTURERS
ARTHUR HOLDEN & SONS LIMITED BIRMINGHAM

Three ideal closures . . .



FOLD and they HOLD

ITS EASY WITH FOLD-HOLD

The ideal closure — fixed in a second — completely air-tight and secure, yet easily replaceable.

FOLD-SEAL

The pilfer proof closure — gum backed — just moisten the ends — they seal as they fold.

All Kleen-Klip closures can be supplied plain and printed with names, trade marks, slogans, etc. or in coloured foils. Ask how K-K products can aid you.

Just as easy to use as Fold-Holds. Sealing type of Ring-Clips similar to Fold-Seals are also available.

SOLE MANUFACTURERS

KLEEN KLIPS

LIMITED

★ **NOTE** *Change of Address*

SPECIALISED CLIP MANUFACTURERS

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Telephone: Gladstone 4287. Telegrams: Kleen-Klips, Telex, London

KK/6463

SUPREMACY IN FABRICATION

This Receiving Tank in Stainless Steel is an important piece of plant. It was to our customer. He examined the inside surface with infinite care, looking for bacteria trapping pin-holes that would impair his product. We confidently welcome such attention because we know our job.

TB
BILSTON

THOMPSON BROTHERS
(BILSTON) **LTD**

BRADLEY ENGINEERING WORKS · BILSTON · STAFFS
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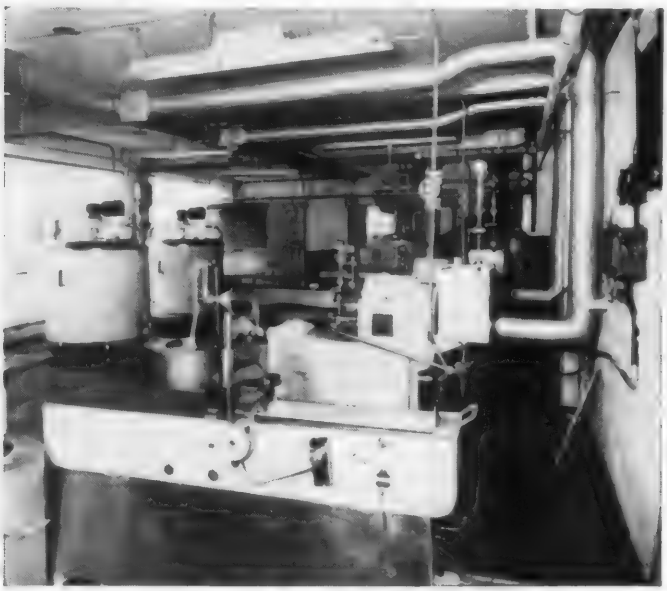
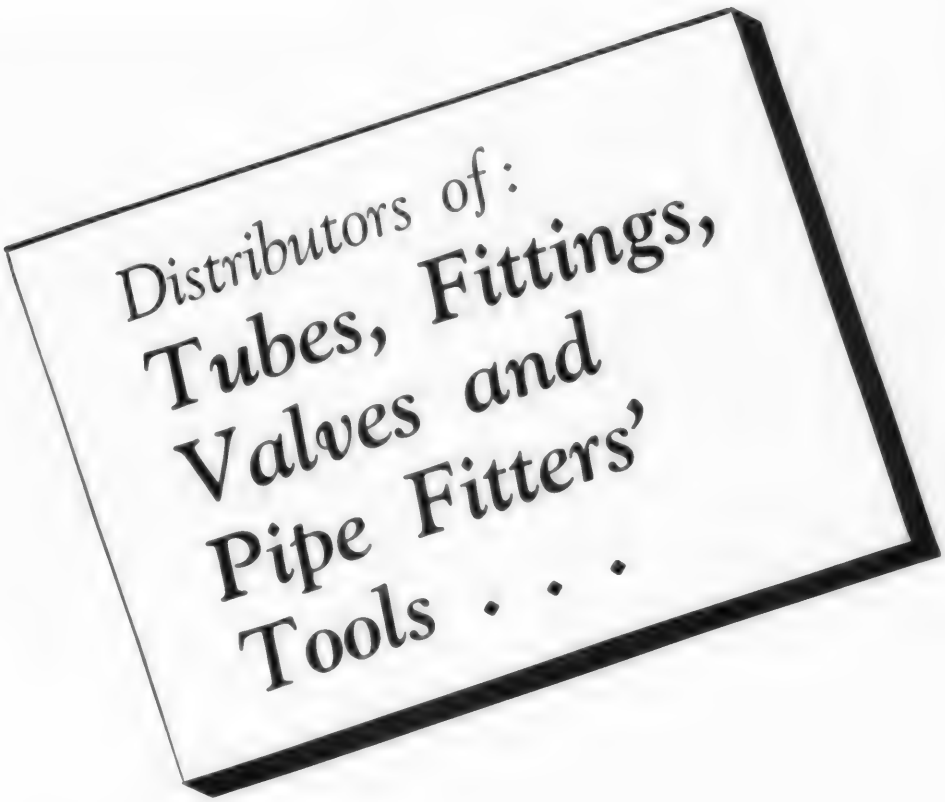
GIVE UP SMOKING? I NEVER STARTED! says Mr. Therm

Gas burnt in Mr. Therm's gas-heated appliances never produces the slightest smut or smoke. It is so clean in operation that gas equipment is kept hard at it with complete success in many places where almost surgical cleanliness is essential; and the maintenance of the equipment is confined to an easily handled minimum. The other advantages of gas as a fuel—flexibility, ease of control, rapid heating from cold and high efficiency—are so well known that Mr. Therm's face is familiar in factories all over Britain.



Here is gas showing its paces — and its cleanliness — to some purpose. This ice cream making plant at Great Yarmouth, one of the most modern in the country, can produce 120 gallons per hour of finished ice cream. The fully automatic gas-fired boiler copes with all steam-raising duties, and is located together with the complete processing plant—brickcutter, two freezers, viscoliser, mix pasteuriser, ageing vats and mix cooker —in one room.

MR. THERM BURNS TO SERVE YOU! THE GAS COUNCIL · 1 GROSVENOR PLACE · LONDON SW1



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THE GREEKS HAD A NAME FOR IT

Τραγάκανθος

BUT YOU HAVE A BETTER ONE

RED CARNATION BRAND

TO ENSURE THAT YOU ALWAYS

GET **GUM TRAGACANTH** OF

THE **RIGHT** QUALITY

AND CHARACTERISTICS

THE literal translation of Tragacanth, from the Greek, is "Goat thorn," descriptive of the spiny shrub from which the Gum exudes. Being a natural product, with natural imperfections and variations, the commercial applications of Gum Tragacanth have been attended by problems which arise whenever the characteristics of an ingredient are not stable. The use of RED CARNATION Brand Gum Tragacanth, however, solves these problems.

UNCHANGING QUALITY

Whenever you order RED CARNATION Brand, you know what you will be receiving—Gum Tragacanth in a stabilised form as regards viscosity (established under expert supervision), colour (scientifically checked) and fineness of powder (ground by a special process to ensure controlled tenuity).

FRESHNESS ASSURED

We are Britain's largest suppliers of Gum Tragacanth. The large turnover obviates the risk of Gum in stock deteriorating through long storage, and you can be sure, therefore, of the freshness of RED CARNATION Brand Gum Tragacanth. The 14 lb. airtight tin safeguards its freshness.

FOUR GRADES AVAILABLE

RED CARNATION Brand Gum Tragacanth has been graded into a series of four predetermined standards: BXXX, BXX, BX, BA. Our Research Department will be pleased to advise you as to which Grade is most suited to your requirements and to answer any other queries regarding RED CARNATION Brand. May we send you samples and our 12-pp. illustrated booklet "The Story of Gum Tragacanth"?

KIMPTON BROS. LTD.

Established 1882

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Above all — easy on the eye, easy to erect, easy to maintain

These are examples from the wide range of lighting fittings in our publication S.P. 7121/21. Avail yourself of the help and advice of lighting specialists and instal

METROVICK *Lighting*

METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

ST. PAUL'S CORNER, 1/3, ST. PAUL'S CHURCHYARD, LONDON E.C.4.

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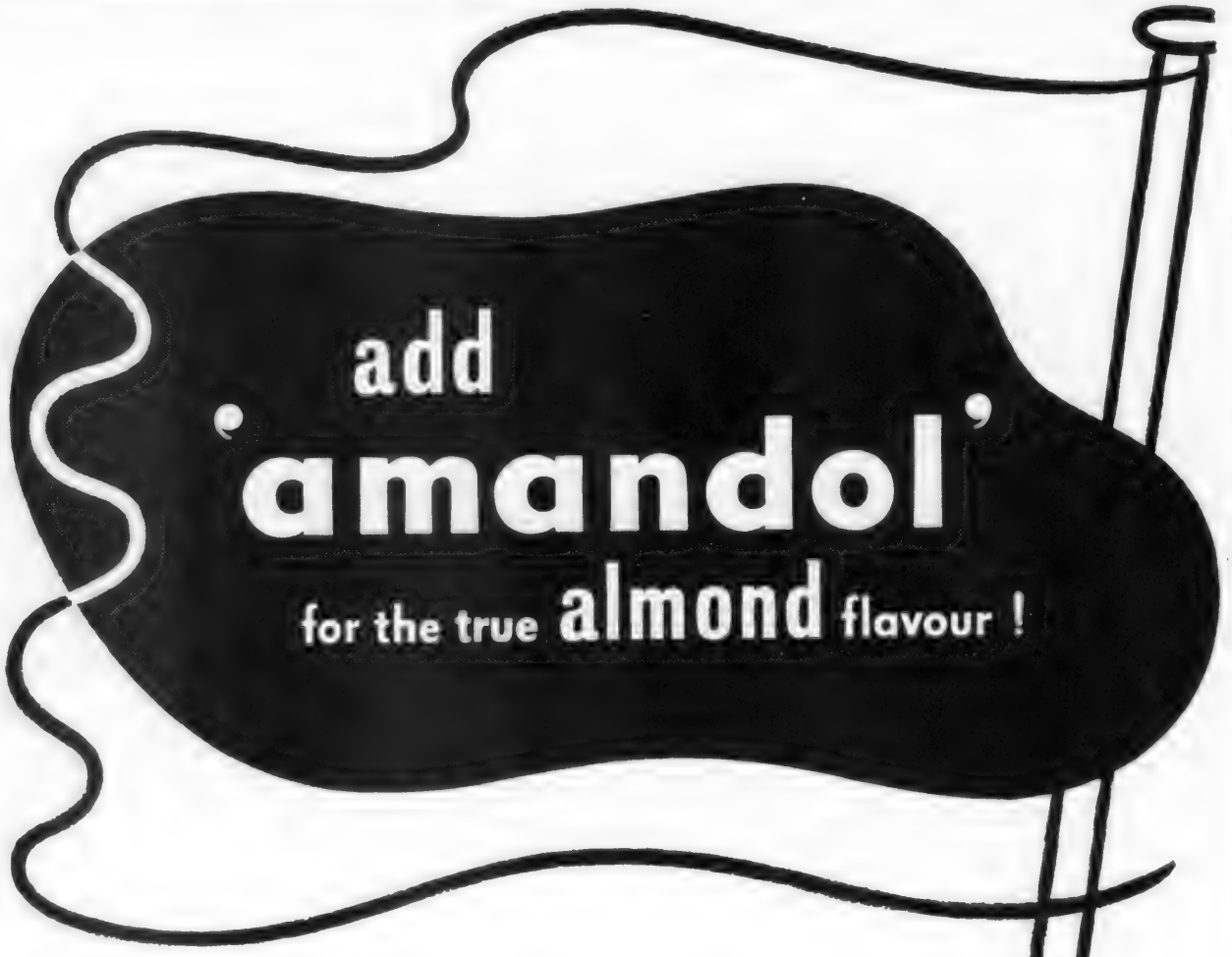

* **'Amandol'** *brand benzaldehyde is a synthetic bitter almond oil with the characteristic odour and flavour of the natural product.*

Being of maximum purity it may be used as an ingredient of food flavours with every confidence.

'Amandol' contains approximately 99% Benzaldehyde as against the 90% required by B.P.C. monograph.

We shall be glad to send you a sample

* Trade Mark

MAY & BAKER LTD Dagenham

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AD49

MIXING IS OUR BUSINESS

Although our standard mixers are used in a wide variety of industries, we have often adapted a standard model for a special purpose. We have solved mixing problems by modifying the bowl size and shape, adjusting the speed ratios, or strengthening the mixing beaters. Successful mixing depends on the experienced co-operation of the mixing machine engineer—over 60 years experience of mixing problems are built into every Morton mixer. This experience is at your service to solve your mixing problems.

MORTON

MADE IN SCOTLAND

Write for literature on any particular machine in which you may be interested, or send for our latest catalogue of the full range of Morton Machines.

MORTON MACHINE CO. LTD.
WISHAW · SCOTLAND

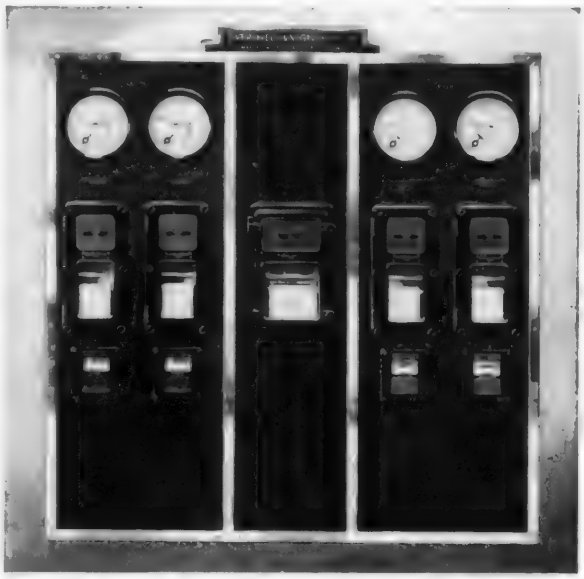
917

How to keep the Night Watchman Awake!

Eversheds are sometimes called upon to supply recorders for strange purposes. Once a firm even purchased an Evershed Recorder to keep the night watchman awake! This particular individual had important duties to perform in processes left unattended during silent hours, and the recorder chart gave the management a precise picture of exactly how well the job was being done. As in many other industries a permanent record was wanted of information normally available for a fleeting second.

Industrial concerns, public undertakings, development engineers and research scientists alike pay tribute to the reliability of Evershed recorders, which can be used without supervision in unattended stations. Abnormal demands, unexpected fluctuations and excessive loads can all be studied, and suitable precautionary measures taken to prevent overloading and reduce unnecessary expenditure. In fact Evershed recorders give a visual picture of exactly what took place, and when it occurred.

continued in next column



Evershed Recorder Panel for distant indication and recording of electrical loads in a modern film studio.

Here are a few of the many purposes for which Evershed recorders are now being used:—

A cigarette manufacturer uses them to check the weight of packets as they come off production lines.

New Zealand railways keep a permanent record of shunting operations and thus study the most efficient methods.

The Post Office Engineering Department records the volume of telephone traffic.

The British Electricity Authority has Evershed recorders in power stations to record the outputs of generators, consumer demands, purity of boiler feed water and all kinds of valuable data. Portable models are used to obtain information on network conditions.

Water and sewage undertakings keep accurate records of the number of pumps in operation at any time.

Manufacturing concerns purchasing electrical power have installed Evershed maximum demand recorders for restricting peak loads and avoiding special tariff charges.

Railways and tramways carry out traction tests with Evershed recorders.

And these are only a few applications. If you would like to know more about Evershed recorders, write today for

Publication . . . F.M. 222

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Telephone: Chiswick 3670. Telegrams: Megger, Chisk, London
Cables: Megger, London

5/135

EVERSHED TEST THE WIRE!

Infinite care is taken with every detail in the manufacture of Evershed instruments.

Before wire is used, for example, it has to pass through a special 'wire-tester' designed in the Evershed laboratories.

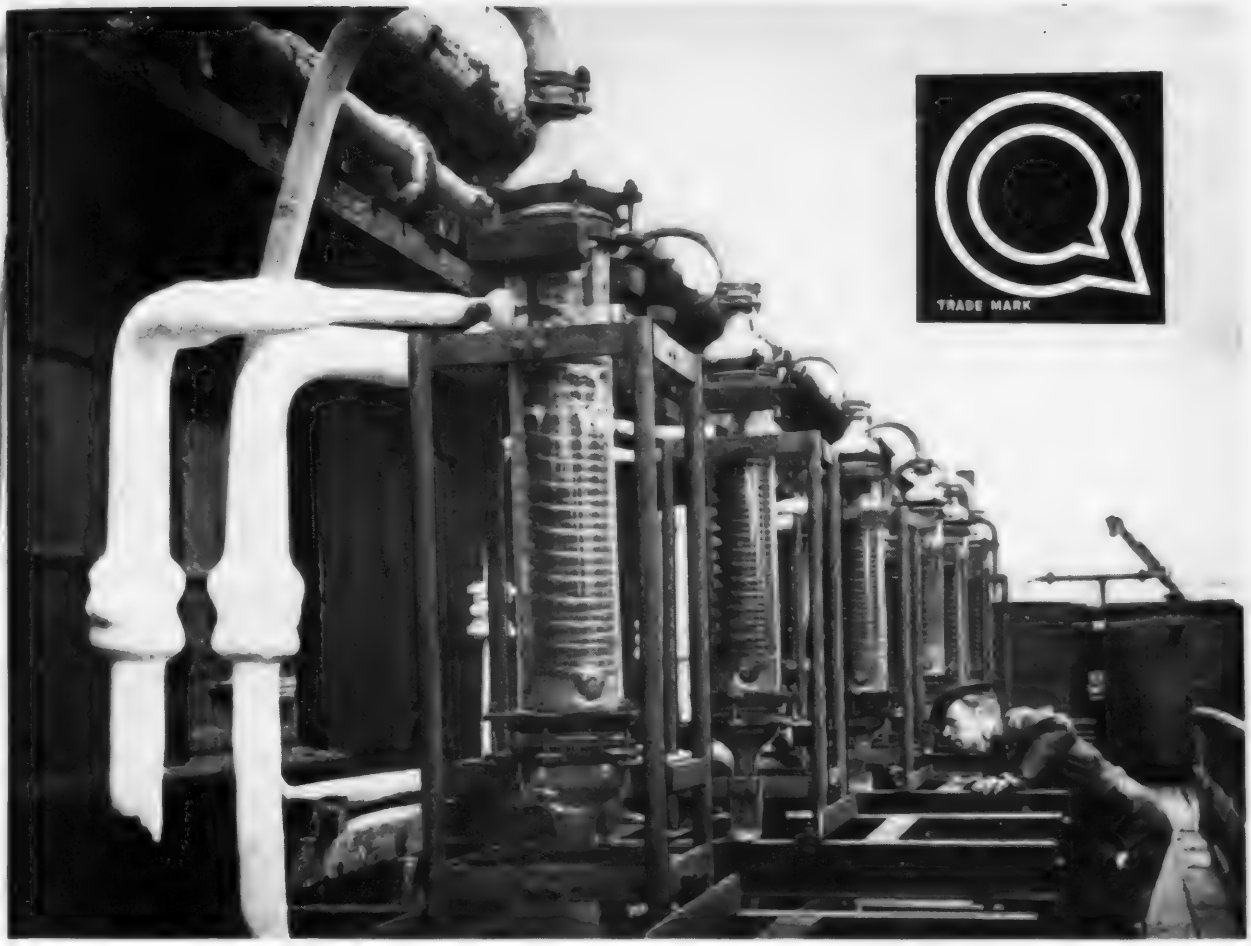
Only then is it handed on to the production department.

U.S. ADVISED 'USE MEGGER TESTERS'

The American Associated Factory Mutual Fire Insurance Companies advocate annual check of earth resistances and say "the 'Megger' Earth Tester is easiest, quickest and most accurate method of doing this".

EVERSHED

PROCESS CONTROLLERS
INDICATORS AND RECORDERS
REMOTE CONTROLLERS
MEGGER TESTERS



Industrial Scale Reflex Condensers

Industrial Plant in Glass

The accompanying photograph shows a battery of "Quickfit" All-Glass condensers each having a cooling surface area of 15 sq. ft. in a glass jacket 6″ diameter by 33″ long. Each is capable of condensing steam to water at the rate of 120 lbs. per hour. These condensers provide compact and efficient units which are light in weight, therefore readily assembled and dismantled. They are resistant to corrosion and assure a degree of purity entirely unobtainable using other material.

Write for our illustrated catalogue,
"Industrial Plant in Glass."

QUICKFIT & QUARTZ LTD.

INTERCHANGEABLE LABORATORY GLASSWARE
INDUSTRIAL PLANT IN GLASS

Head Office: **1, Albemarle Street, Piccadilly, London, W.1** *Telephone: REGent 8171*

"Quickfit" Works, Stone, Staffs.
Telephone: Stone 481

Maybe, now that deliveries are easier, you wonder why C.R.S is still collecting empty containers.

Deliveries are easier because of your support, and it is in your interests to see that C.R.S keeps going.

It's your service for your benefit!

Container Recovery Service

S.P.D. Limited, 3-5 Salisbury Square, London, E.C.4

CRS 59·940·60

— cleaner even than stainless steel. For the preparation and storage of all food and dairy products use Pfaudler glass lined steel equipment, the factory equivalent of spotless laboratory glassware. The installation shown here comprises an 800 gallon and two 1500 gallon Pfaudler tanks.

PFAUDLER

GLASS LINED STEEL EQUIPMENT

ENAMELLED METAL PRODUCTS CORPORATION (1933) LTD
Artillery House, London, S.W.1. Abbey 2168. Pfaudler-Sowest-London
Leven, Fife, Scotland. Leven 79 Pfaudler-Leven-Fife

A member of the BALFOUR Group of Companies

P.F.8

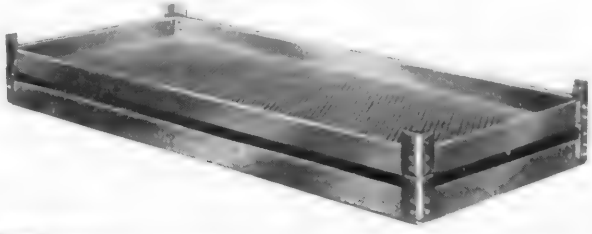
PHŒNIX *Service for the Food Industry*

TRAYS & CONTAINERS FOR ALL TRADES

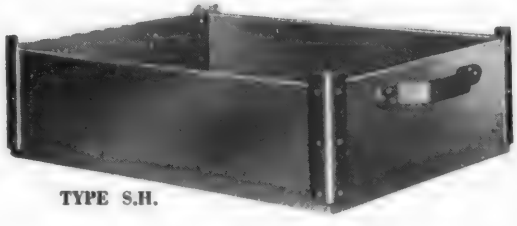
MANUFACTURED FROM LIGHT ALLOY OF EXCEPTIONAL QUALITIES

NO FEAR of splinters, screws or nails finding their way into finished products
CORROSION resisting right through · Easily CLEANED · HYGIENIC for food
LIGHTWEIGHT but very STRONG

TYPE P.1.
(PERFORATED BASE)



TYPE F.C.1.



TYPE S.H.

TYPE S.2.

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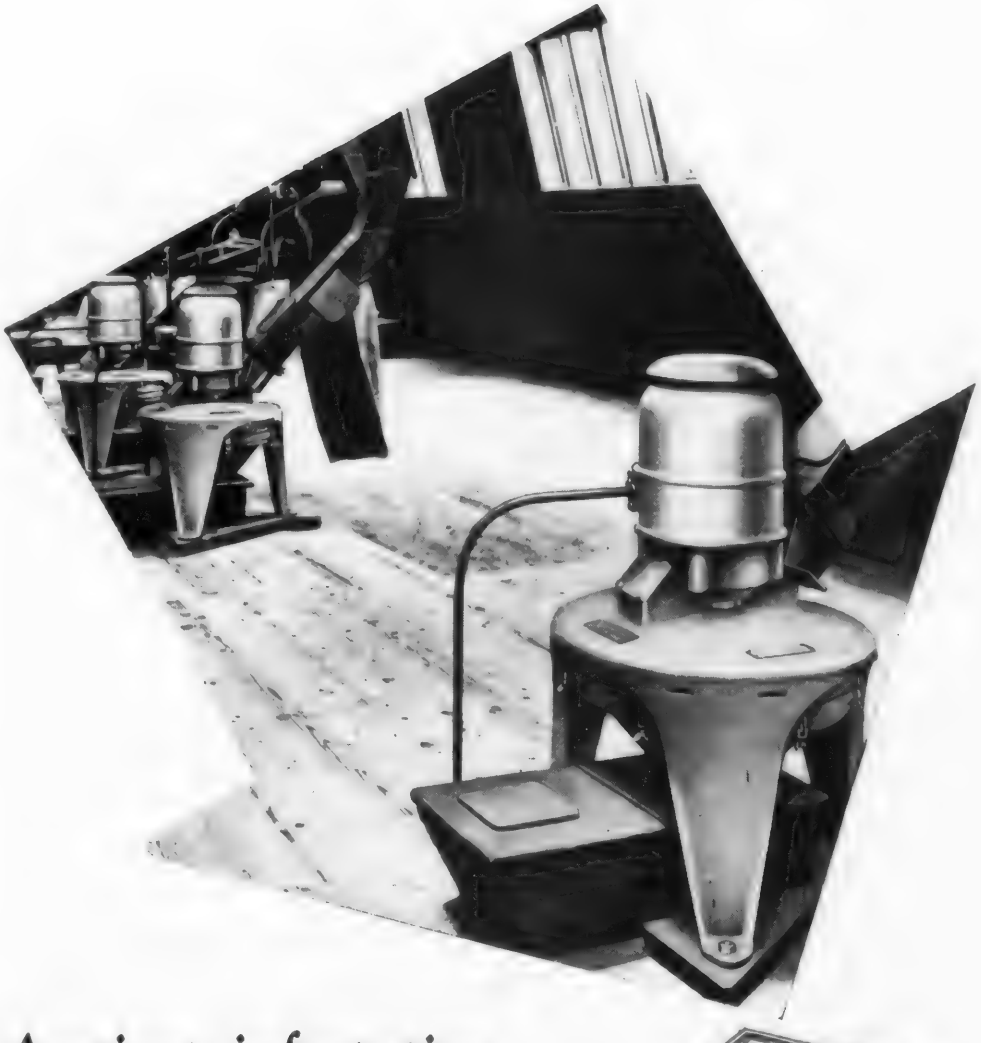

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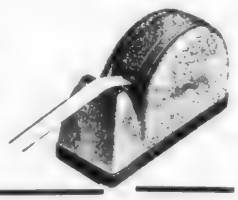

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Regd. Trade Mark

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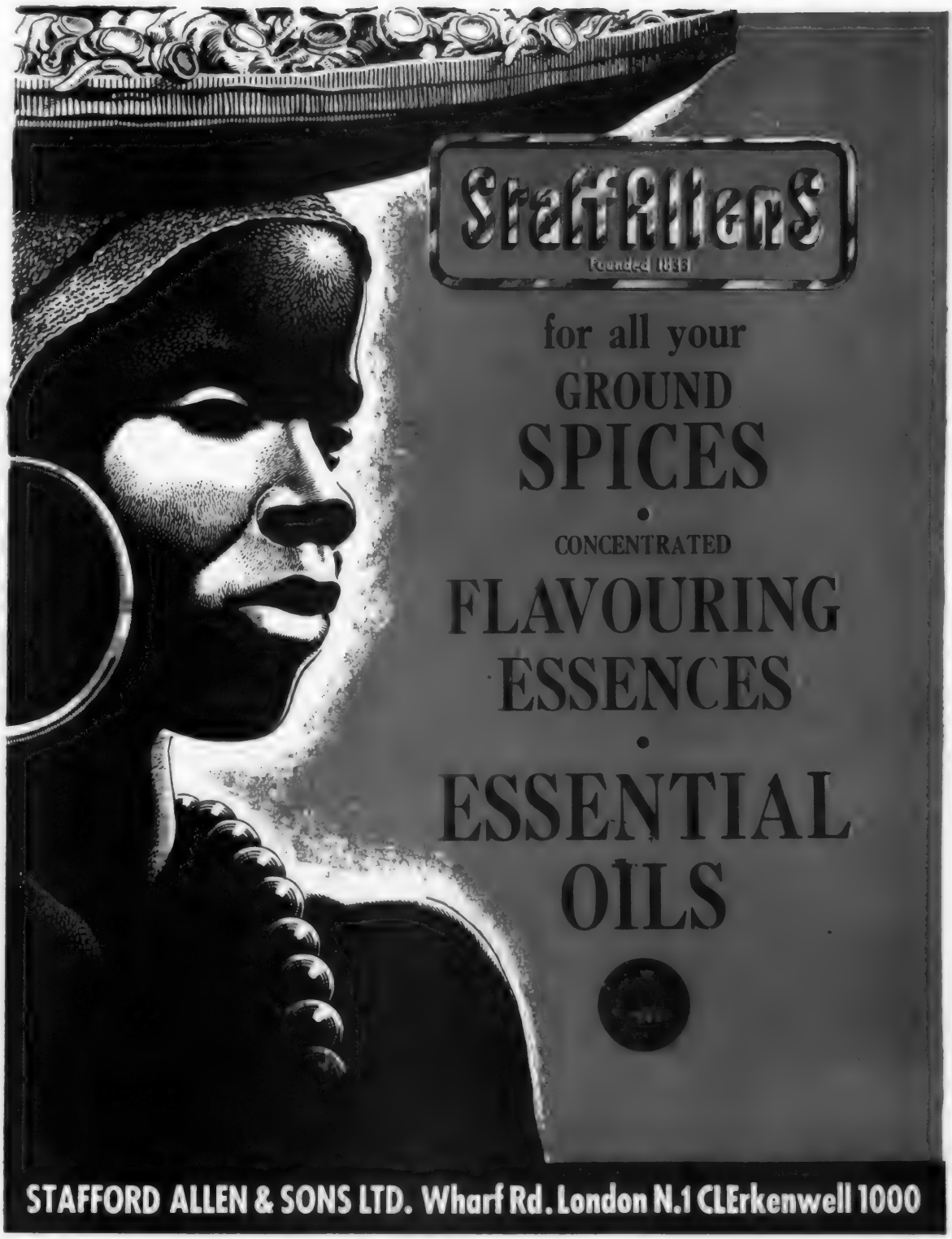
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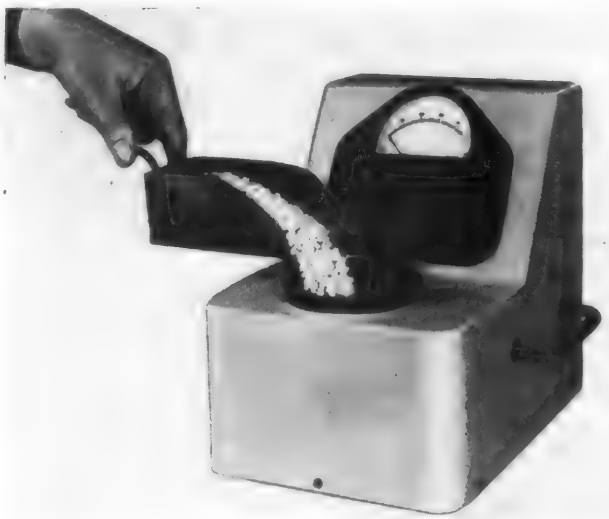

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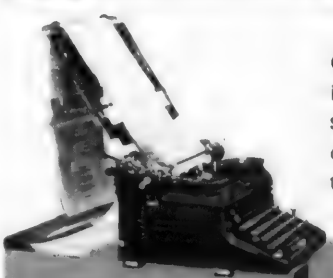

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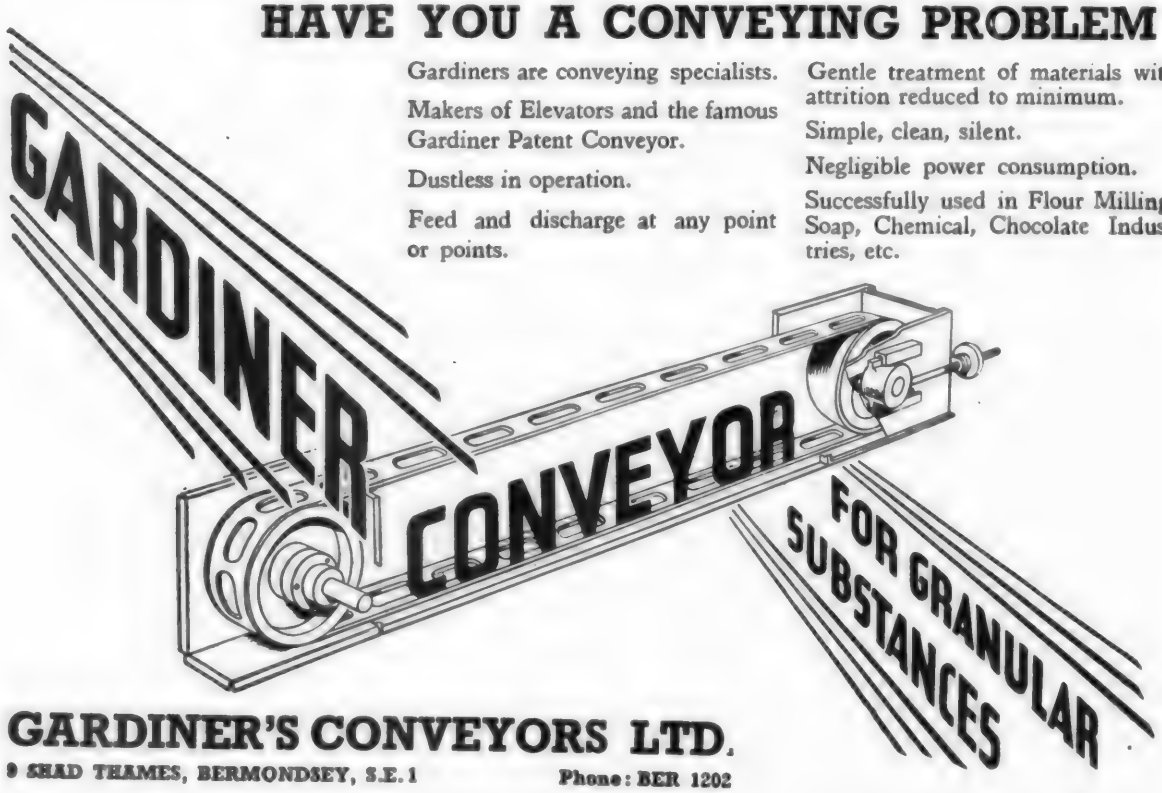

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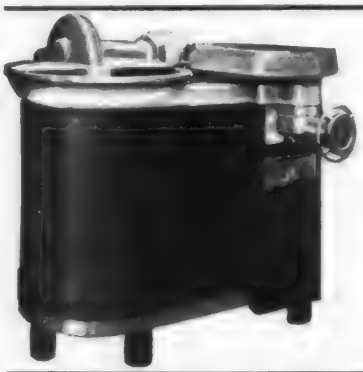

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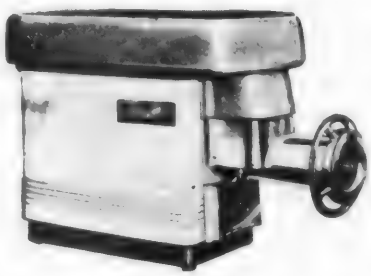

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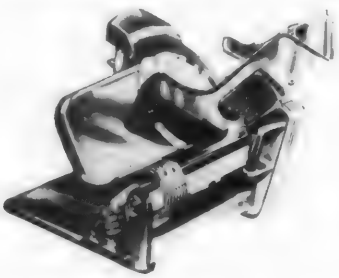

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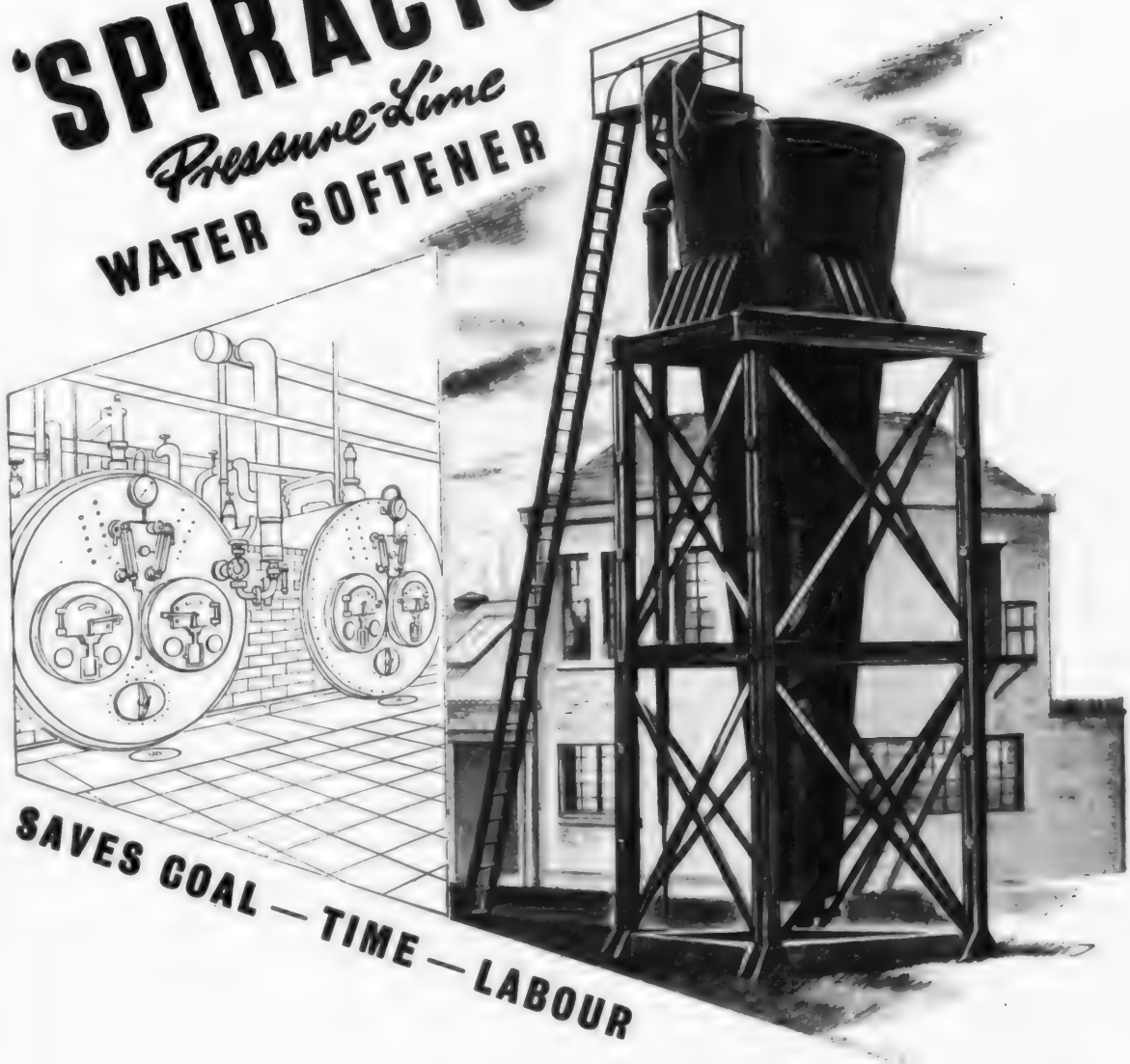

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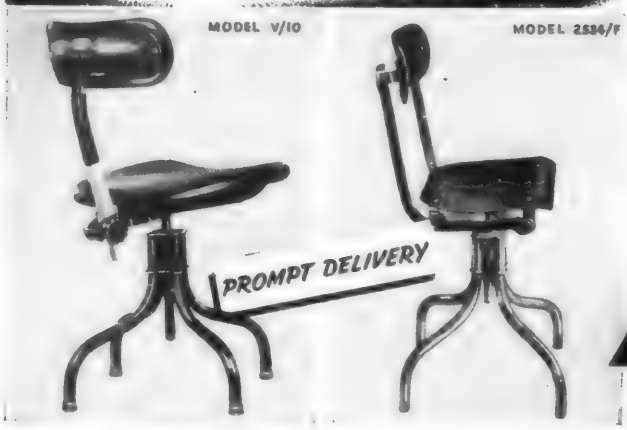

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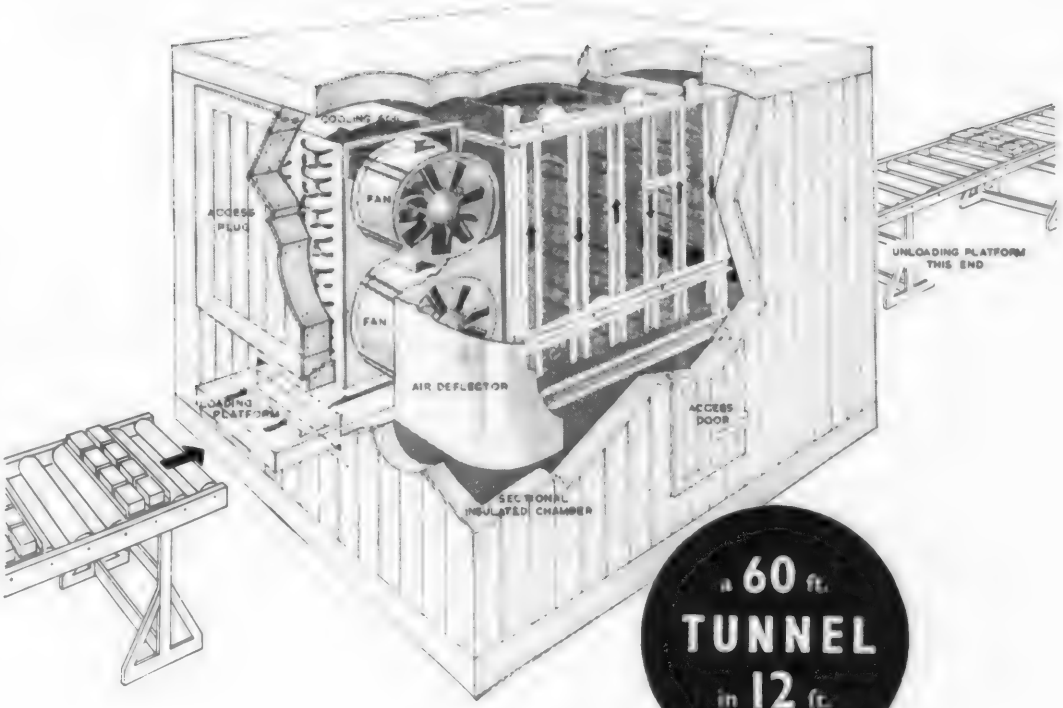

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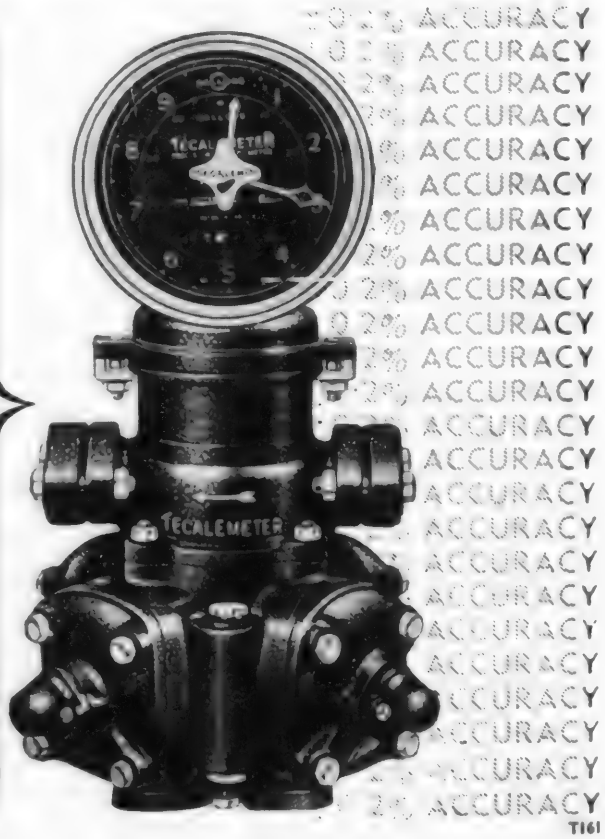

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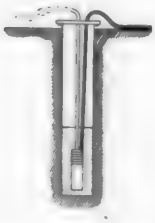

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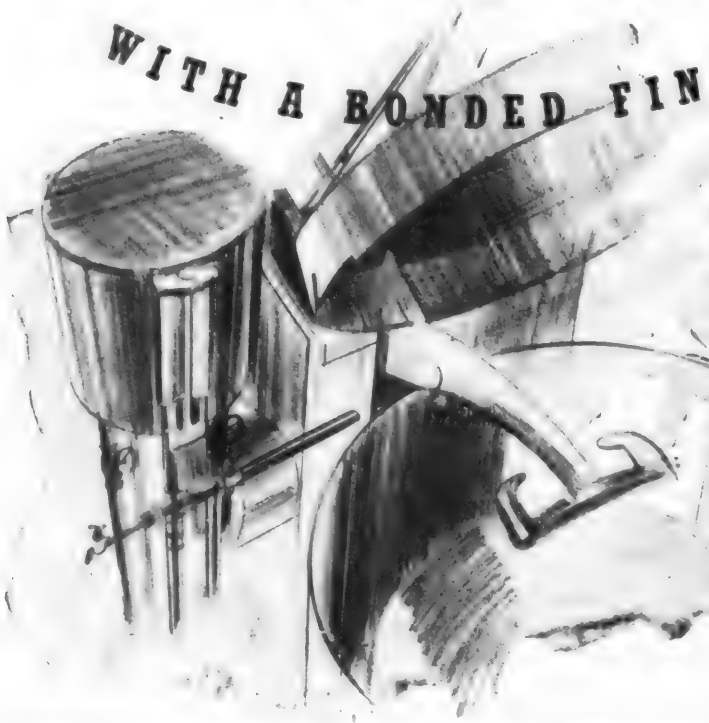

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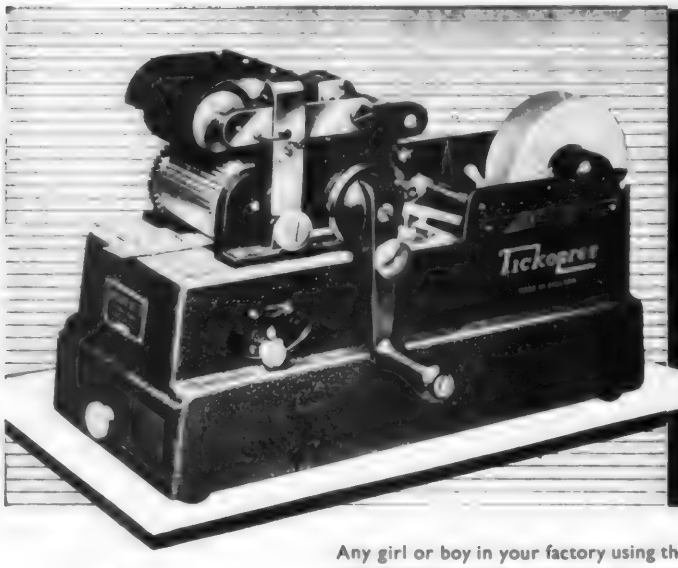

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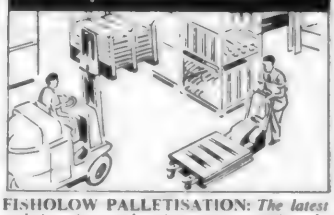

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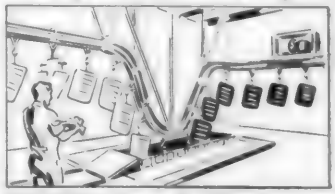

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FOOD MANUFACTURE

Vol. XXV. No. 1 · Published Monthly · January 1, 1950

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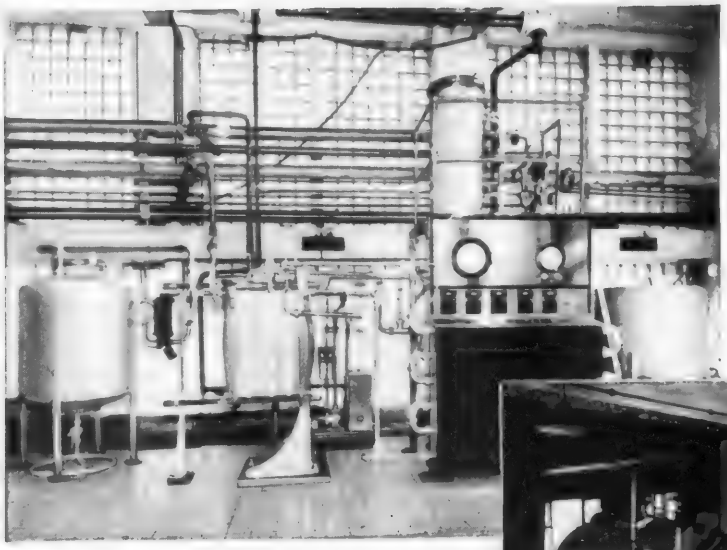

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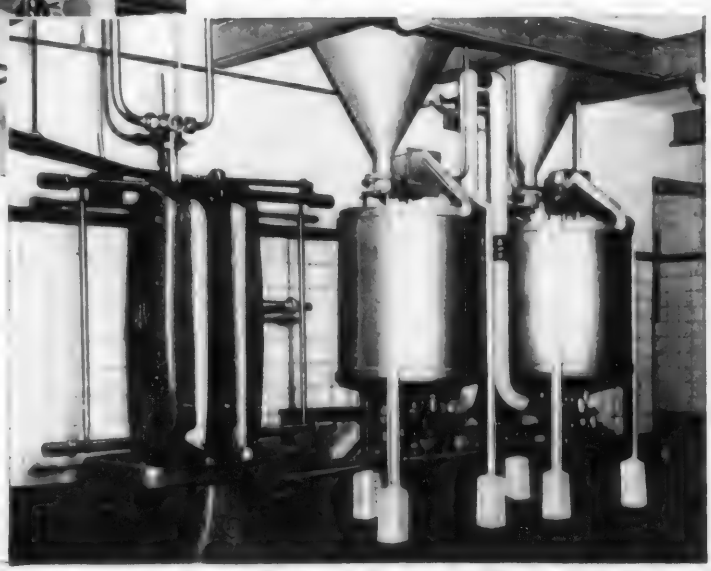

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FOOD MANUFACTURE

Vol. XXV, No. 1 January 1, 1950

January 1950

UPON the threshold of a new year we are inclined to forget "those fatuous, ineffectual yesterdays" and to look forward with as much hope as possible to a brave new world. There are dangers ahead, but "dangers bring fears and fears more dangers bring."

This first month of the year brings us one item of special pleasure, which we hope will be shared by our readers at home and overseas.

It was in March, 1942, by reason of the paper shortage which had already curtailed the number of our pages, that we were obliged to reduce the size of FOOD MANUFACTURE, but at long last it has been possible to resume its original size.

During eight years of austerity we have endeavoured to retain our individuality so far as circumstances allowed. There are some who did not know us in our former guise, but they will not now be seeing something strange, and will, we hope, join with our older readers in welcoming an old friend in its original garb.

Sweet-fat Enquiry

There is a possibility that sweet-fat, which has been a very useful ration-free material used in a number of food manufacturing industries for some time, may be brought under some form of control by the Ministry of Food. Among those affected are the bakery, sugar confectionery, and ice cream industries.

Following complaints about the sale of ration-free sweets in which sweet-fat is an important ingredient, Mr. John Strachey, Minister of Food, has begun an examination of the matter in consultation with trade users.

A number of firms that have no allocations of ingredients based on datum usage have begun the manufacture of sweets and/or ice cream using sweet-fat as the key product. While some of these firms are marketing very creditable products, others are not, and Mr. Strachey is eager to prevent the misuse of this valuable ingredient.

It is understood that one point that will be considered is whether the Ministry should control the distribution of sweet-fat. Bakers, confectioners, and ice cream manufacturers believe that if the Ministry control the product for one industry they must control it for all. The general opinion is, however, that this is the time to relax controls, not to impose new ones. It is also thought that control, which would probably necessitate some form of rationing, might put out of business some very desirable newcomers to these trades as well as cause a certain amount of unemployment.

Sweet-fat is an imported product, and control might necessitate the Ministry of Food becoming the sole importer. It is feared that such a step would almost certainly lead to a diminution of supplies and an increase in price.

At present the Ministry is trying to deal with the matter from the retail end, but Mr. Strachey has said that he does not yet know what action will be "appropriate or desirable." Trade organisations are making every effort to keep sweet-fat free from restrictions.

Synthetic Amino Acid Production

One solution to the world food and population problem is the technical up-grading of agriculture, and another is the production of synthetic food. To some people the idea may be emotionally disturbing; to others it may be a technical "castle in the air." Nevertheless, it has been recently reported in the United States that the first commercial plant to manufacture an important amino acid synthetically will soon start operations. One fact is worth a dozen arguments and speculations.

The amino acid to be synthesised is methionine. Its intended use ties up with American war-time research on poultry feeding. With the war-time shortage of feedingstuffs of animal origin, chickens were fed with higher proportions of vegetable pro-

THE EDITOR SENDS SEASONAL GREETINGS TO ALL READERS

teins; indeed, the proportions rose to heights that were formerly considered impracticable. A vegetable feedingstuff that was widely used was soya bean meal. Poultry nutrition research showed that vegetable sources of protein were effective if supplemented by two to four per cent. of an animal-origin feed such as fish meal, or by additions of methionine. Oddly enough, the fish meal additions did not contain as much methionine, and it was shown that several of these effective supplements had exchangeable virtues. This work was carried out upon growing chicks, so it can be assumed that more than nutritional maintenance was investigated.

As a result of this work methionine has been considerably used in recent years as a supplement to poultry feeds. It has been shown to increase poultry weight at a lower cost than that of normal animal-origin protein supplements. The new plant is expected to supply the synthetic product on a large scale for poultry feeding.

The eventual consumers of roast chicken and turkey will doubtless be unaware that some proportion of their meal has a synthetic basis; but there is no fundamental difference between this development and that of using urea as a supplement for dairy cattle feedingstuffs or, indeed, of our own use of synthetic vitamins.

Those who suppose the synthetic food idea to be improbable forget the progress that has already been achieved. It will not be many years before synthetic food has a sufficient number of bridgeheads to establish a broad front; not until then will the size and speed of the real advances be assessable.

Dehydrated Blood Plasma

Important chemical manufacturers at Ludwigshafen will shortly be placing dehydrated blood plasma on the market.

Submitted to severe and prolonged tests by the Veterinary Testing Office in Hamburg and the Food Hygiene Institute of Berlin University, it has now been passed as suitable for human consumption by the Veterinary Commission for Western Germany.

The dehydrated plasma is to be placed at the disposal of butchers, who will find it a welcome help, especially when they are not slaughtering, and have to utilise frozen meat for sausage manufacture.

The new plasma is a highly nutritious animal albumen product and is dissolved in the proportion one in eight, in which state it can be applied just like fluid plasma up to 1½ per cent. in the manufacture of sausage.

Consistency Tests for Jams

A new method of measuring consistency in jams has been developed by the Technical Committee of the National Preservers' Association of America.

The equipment, known as the spreadmeter, consists of a series of concentric circles which, in actual use, are engraved on a plexiglass plate. The sample of jam to be tested is emptied in the middle spot and permitted to flow out freely. After five minutes the flow is read at a minimum of four points on the plate, and an average is taken, the readings indicating the diameter in centimetres.

Certain products should have fairly standard consistencies for good quality. For example, peach and pineapple jams have an optimum consistency of 16 to 18, and raspberry's most satisfactory average would be 20.

The plexiglass plate engraved with the spreadmeter scale can be mounted in a frame with a light underneath so that samples may be examined for defects as well as consistency. A one-quarter inch square area is engraved on the plate for use in measuring percentage of extraneous material.

For the most accurate readings jams should not be tested until several days after packing; in fact, in the case of such jams as peach and apricot, it was recommended that samples be held for several weeks, with consistency tests every few days.

Supplies and Services Acts

According to a statement by a Government spokesman, the Supplies and Services Acts, 1945 and 1947, due to expire on December 10, 1950, which confer the power of exercising control over industry, will be renewed in the event of the return to office of the present Government at the coming general election.

The Acts cover the maintenance, control, and regulation of supplies and services, which are exercised through certain Orders in Council, founded on the Defence (General) Regulations 1939 (Parts III and IV), with other Regulations—*e.g.* Defence (Encouragement of Exports) 1940, Defence (Finance) Regulations, etc., but only those regulations can be continued by the Acts under review. These number 138, and are quite sufficient to give the Government complete control if it so desires, as they cover practically everything relating to industry and trade.

Of particular interest to industry as well as firms and individuals are the powers of control contained in Part IV of the Defence Regulations retained and operating by Orders in Council. This Part gives power to regulate or prohibit the production, treatment, storage, transport, distribution, disposal,

acquisition, and use or consumption of articles of any description. Road and rail matters, agricultural affairs, requisitioning, etc., also come under Part IV. Under the powers conferred by these Acts come such things as limitation of supplies, licensing, rationing of production, and of raw materials. Included also are the coupon business and points system, the direction of labour, and the taking over of shares of companies trading as individual concerns, although there is no power in these Acts to nationalise whole industries.

Fat in the Fire

There was a time when there were notices to be found along many European country roads that butter was for sale. According to reports in December, nearly 4½ million pounds of butter were being offered for sale by Denmark to the United States. Denmark, acutely short of dollars, thought it advisable to secure dollars from a direct source, and to make sure of it she offered her butter a few cents per pound below the American home-price.

What happened? The U.S. Department of Agriculture refused permission for the butter to be imported because it was already suffering from the headache of American farmers' butter accumulating to the tune of 100 million pounds! The last we heard of the matter before the time of this writing was that Denmark was asking the Marshall Aid Administrator what the next move should be.

We must confess that this is a most disquieting story. One of war-battered man's highest hopes has been that the old divisions of "Have" and "Have-Not" countries could at least be softened. Yet it seems that the dollar barrier to trade produces an even more complex disequilibrium and creates "Want" and "Want-Not" countries as well. We can hardly expect American citizens to get into the habit of buttering both sides of their bread and toasties. Yet Denmark, a traditionally butter-producing and butter-exporting country, has butter to offer and needs dollars. Meanwhile, other traditionally butter-consuming and butter-importing countries much nearer Denmark, but unable to offer dollars, cannot often put butter even on one side of their bread.

To the orthodox, hard-headed economist this state of affairs may be easy to explain. If poor people want to get cash from rich people they must offer goods and services which rich people cannot provide adequately for themselves. Yet butter is one of the most generally desirable commodities in the world—it is not a luxury gadget made out of moulded plastic. If Western Europe is regarded as a nutritional whole, it is a most painful sacrifice for one of its members to offer 4½ million pounds of butter in order to obtain dollars.

The new dominance of the dollar in world trade may have consequences which are far worse than anything we have yet experienced or visualised. When the pound sterling was the major unit of currency, the world was helped by the fact that the central source of sterling was far from self-sufficient for food and many other basic materials. This is not true of the United States, and no case could be more striking than this example of butter.

What is to be done? Is it only a matter of working harder and longer and making sacrifices? Is it suggested that Denmark, in producing and offering this butter, has not already done that?

Pepper

A further chapter in the history of pepper can be written in view of today's soaring prices—£1,000 a ton compared with from £50 to £70 in pre-war days. Food manufacturers using substitutes in spiced meats, pies, and sausages—substitutes reported to be "84 per cent. buckwheat, 8 per cent. cayenne, 5 per cent. ground pepper, plus a small proportion of an aromatic seed"—are experiencing a phase similar to that in Germany in years of blockade, when "peppery" compounds to resemble piperine were called for by food industries.

The pepper trade was flourishing enough when Singapore as chief market sent out 65,000 tons a year, with Penang, Riouw, and Johore holding the lead in production figures; but the Japanese altered things. Britain had to look to India, since continued disturbances in the East Indies prevented replanting, and India cannot provide enough.

The tale of pepper began in Sanskrit, thence to the use of pepper as barter, or even as ransom to the tune of 3,000 lb. in the siege of Rome. In the Middle Ages pepper was one of the most costly spices, a few pounds being deemed "a princely present." Lack of pepper helped to drive the Portuguese round the Cape of Good Hope and give the Dutch their East Indies.

Today's shortage will sooner or later incite some humorist to ask Mr. Strachey if pepper in place of groundnuts wouldn't save his bacon or help him now he's in the soup. Certain it is that when London restaurants have to warn their staff to be careful with the pepper, we are not far off from that kitchen episode when Alice heard the Duchess

> speak severely to my boy,
> I beat him when he sneezes;
> For he can thoroughly enjoy
> The pepper when he pleases!

A Factory in a Forest

Bound on one side by the Severn and on the other by the Wye gorge lies the Royal Forest of Dean, in which the 100-year old firm of H. W. Carter and Company has recently built a factory for the preparation of fruit products. Not only has every modern device been incorporated in the layout of the manufacturing side, but constant and intensive research is being carried out by an enthusiastic team of chemists in elaborately equipped laboratories. This is the story of the conception and birth of this progressive concern.

The start of the job.

THE company was, until last year, established at the Old Refinery, Bristol, as manufacturers of fruit squashes and cordials. In 1936 Mr. F. D. Armstrong became acquainted with the work which was being done at Long Ashton on juices and soft fruit syrups and, after a period of six months, he decided that these products were worth manufacturing on a large scale. He came to an arrangement with Bristol University for their continued advice to be given to the company in equipping a factory to make these syrups and for the University to undertake technical control of the factory for the first two seasons. In this way the so-called National Mark pure fruit syrups came into being.

On arrival at the factory the apples are graded.

The only previous work carried out on their production had been of an experimental nature. The transference of the process from this empirical laboratory scale to full-scale factory operation gave rise to many problems, but, by the end of the season, over 100,000 gallons of pure syrups had been processed without the loss of one cwt. of fruit.

This venture coincided with the development of milk bars in Great Britain and the syrups were put on the market through grocers' shops or the milk bars themselves. During the first year there was considerable consumer resistance, on account of the higher price, but in 1937 the syrups, with the exception of blackcurrant, the flavour of which was not liked in milk, were selling freely throughout the whole of the British Isles.

The fruits handled were strawberries, raspberries, loganberries, blackcurrants, and blackberries.

The school authorities took the milk shake syrups to make the milk more palatable for the school children and within two seasons the products became well established for the purpose.

The blackcurrant syrup was examined for vitamin C activity by pure chance, and after a few months of testing it was found that the syrup contained most of the vitamin C in the fruit and retained it extremely well. At exactly the same time a Bristol doctor enquired about the possibility of obtaining a source of natural vitamin C other than a citrus juice for the treatment of duodenal ulcers. The blackcurrant syrup was tried, immediately found to be successful, and so Ribena was born.

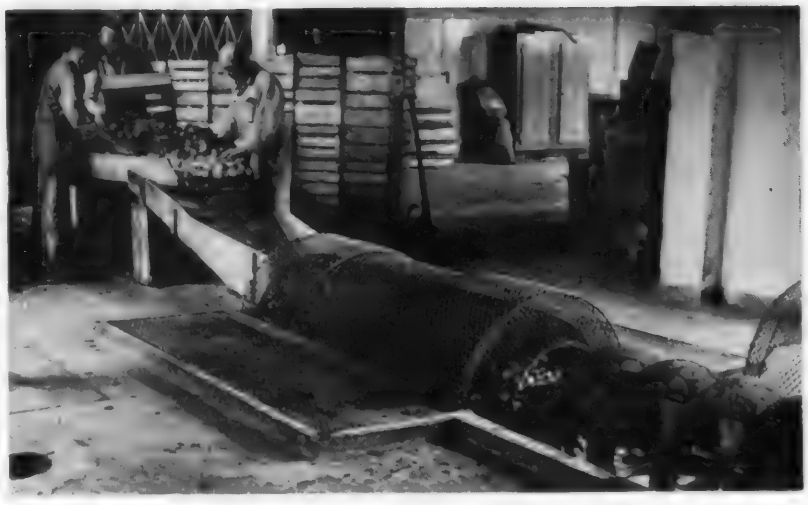
An ethical approach to the sale of this product was established and it represented one of the first natural foodstuffs to contain a guaranteed amount of vitamin C.

When the war started, Ribena had become known nationally as a natural source of vitamin C and as a treatment for hyper-acidity and ulcerative conditions of the stomach.

Bulk Production of Syrup

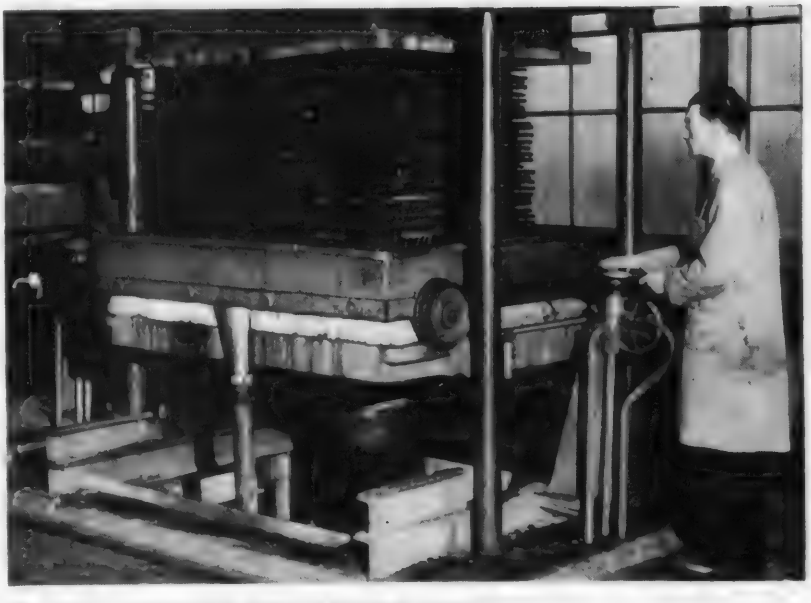
In 1940 the Research Station at Long Ashton was asked by Sir Jack Drummond to assist in the organisation of bulk production of blackcurrant syrup for young children up to six months for free distribution through the Ministry of Food's Welfare Scheme, the first of its kind to be introduced in this country. The whole of the company's Bristol factory was taken over for this work and, to enable more fruit to be treated than could be processed in the fresh fruit season, large tonnages were canned for the Ministry of Food and processed throughout the year into syrup. This lasted for three years, after which the supplies of blackcurrants were much too small to cope with the demand of the higher age group of children, and the product then reverted to its former name and was sold through chemists' shops only to priority customers such as children, invalids, and expectant mothers.

In 1940 the company was approached by the Ministries of Supply and Health with regard to the production of a syrup from rose hips. Very little information was available although some complicated references to Russian literature became available later on. The vitamin C in rose hips proved to be a most elusive factor. If the hips were



Apples pass through the washing machine.

General view of the fruit pressing hall.



The juice is expressed by means of hydraulic presses.

Service duct, showing base of hydraulic presses and juice tanks.

milled too finely the contact with air quickly destroyed the vitamin. If they were not milled at all, the waxy cuticle prevented the water penetrating the skin and dissolving out the vitamin. Attempts were made merely to split open the rose hips; this presented a difficult engineering problem, but eventually the solution was found. Rose hip syrup was eventually made by five companies and quickly became popular in Great Britain.

Lastly, the company was closely concerned with the Ministry of Food in the introduction of orange juice and from the very beginning produced large quantities of this in the Bristol factory.

Choice of Factory Site

By this time it was becoming obvious that the trend of developments was towards vitamin products of a pharmaceutical nature, and that the existing premises in Bristol, threatened on all sides by rebuilding schemes at the end of the war, were unsatisfactory for their purpose. In the west of England the Board of Trade would allow a new factory to employ 300 to 400 people to be built in only two areas under the Location of Industry Act, and eventually the choice fell on Coleford in the heart of the Forest of Dean.

Building operations commenced in the summer of 1946; limited production was carried out in the autumn of 1947, followed up by blackcurrant processing in the same year, the whole of the Bristol factory being transferred to Coleford by March, 1949. The idea was to employ the maximum number of local people where there was a surplus of labour, but a small nucleus of managers, foremen, and senior laboratory personnel had to be brought from Bristol.

There were many difficulties to be overcome. For instance, the existing town water supply undertaken by the local council was not adequate even for the town's needs, and the introduction of a further demand for 10,000 gallons an hour for ten hours a day could not be met, with the result that the company had to arrange to draw its own supply for the Kestner evaporator from a disused iron ore shaft three-quarters of a mile away. The provision of potable water from this mine has been one of the major problems faced by the engineering and laboratory staffs.

Completion of the Factory

The factory was built during a very difficult period under permits supplied by the Board of Trade. It was natural that for a factory of this type, floors, walls, and ceilings had to be provided with a somewhat better finish than for normal engineering premises, and taking into consideration the difficulties of obtaining any type of material during the years in question, the directors have every reason to be proud of its completion, which represents a feat of perseverance and ingenuity. The architecture is in the modern style and the factory merges into the beauty of its surroundings in a remarkable way. The most striking feature is the tower housing the evaporator, and the one-way drive system, which prevents congestion with incoming and outgoing lorries, deserves special mention.

The most difficult problem has been the staffing of the laboratories; at the moment twenty-two chemists of all grades are employed. Naturally, the seniors were transferred from Bristol, but the building up of a junior team from local material has not been easy and is only just nearing completion.

From the time the first brick was laid until March this year the firm had been represented in Coleford by Mr. Melvern G. Dawbarn, factory manager, who was responsible for the collection of local labour, commencement of processing, and the training of the new staff.

Division of Factory Work

The factory is divided into three sections: the first, in charge of Mr. E. J. Martin, deals with the processing of fresh blackcurrants, apples, and rose hips. The second section comprises the bottling rooms for all products, the production of squashes and Ministry of Food orange juice, and the canning line. With the exception of the canning work this section is controlled from the production point of view by Mr. L. T. Darch, B.Sc., who was closely associated with citrus juice subjects in Sicily and in the production of fruit juice products in Great Britain before going to Coleford. The canning section is controlled by Mr. N. D. Armstrong, the son of the managing director.

When Dr. Vernon L. S. Charley was released by the University to help with the first syrup production in 1936 and 1937 his work at the research station was continued by three chemists. One of these, Mr. R. C. Curtis, B.Sc., shortly afterwards left the station to become the chemist for Carter's two Bristol factories. He is now in charge of the analytical laboratory, with a staff of five chemists, in which all raw materials, intermediate products, and finished bottled products are analysed. The other chemist was Mr. N. P. Bridge-

The cooler for the apple juice.

Clarification tanks for juices.

water, B.Sc., who left the research station shortly after Mr. Curtis to take up a commercial appointment, which position he relinquished in 1947 to go to Bristol to undertake the work of technical control and development. Mr. Bridgewater's department at Coleford is responsible for the control of the technique and production throughout the factory. He develops the processes and products from the technical point of view and is available to the two production managers to help in their problems in so far as they concern his section. The softening and sterilisation of water supplies is included in his duties.

Building up the Plant

More recently, since the company have commenced production of their own pectinase enzyme, Mr. Bridgewater's team has been responsible for the building up of plant and carrying out the necessary pilot scale tests. When production has been established on a factory scale, the development section then merely police the process and render assistance as and when it is asked for.

In addition to this work, the company has recently been asked to investigate the possibility of the production of high protein and vitamin products from vegetables, the existing stainless steel equipment rendering the plant particularly suitable for this purpose. Vegetable *purées* and spray dried products of high protein content and vitamin potency have already been produced on the pilot scale plant. Other work includes the spray drying of a mixture of skimmed milk and strawberry syrup which on reconstitution will give a milk shake, and the utilisation of fruit *purées* in the form of "pour-overs" for ice cream and milk puddings.

Quality Control

This department is also responsible for the quality control of most of the products in the factory. In the canning work the Campden Research Station scheme of points is followed, although adjustments are necessary owing to the fact that the canned goods are not being prepared for domestic consumption.

The third member of the original triumvirate is Mr. Darch, who joined forces with his old colleagues in the autumn of 1949.

Pectinase Enzyme Production

It is part of the policy of the company to regard the laboratories as their powerhouse. A well-equipped department devoted to pure research has been initiated under the control of Mr. W. W. Reid, F.R.I.C., who was until recently chief chemist of one of the largest penicillin factories in Great Britain. This biochemical laboratory is allowed free scope to examine problems at an almost academic level. Its main concern so far has been the production of the pectinase enzyme (in association with the microbiological laboratory) and the separation from blackcurrant materials of some active principles which have the effect of inhibiting the action of the enzyme systems which results in the oxida-

Pulp and sterilising filters.

tion of vitamin C in natural fruit juices. This work has led to the suggestion that these materials are similar in composition to the so-called "vitamin P" complex, and a considerable amount of medical work is now being done in collaboration with a London hospital in assessing the potency of various fractions obtained in this laboratory. Chromatographic analyses are being widely employed in this work.

Constituents of Apple Juice

Since 1947 the laboratories have carried out very comprehensive examinations of the constituents of apple juice prepared from various varieties of fruit in certain of the main fruit growing areas of Great Britain, with a view to ascertaining whether or not the analytical composition of these juices could be used as a means of policing certain regulations for standardising juices by Governmental action. These analyses are being continued over a period of years and are yielding results in many quite unexpected ways.

Mr. Reid also controls the microbiological laboratory, which has a dual responsibility: first, to test the thousands of barrels of imported citrus juices, and secondly, to check the sterility of all products leaving the factory and to apply certain techniques to ensure sterility in factory operations. This last feature was commenced in Bristol, when considerable trouble was encountered in processing Ministry orange juice without the incidence of fermentation. In Bristol attempts were made to impress the workpeople with the need for cleanliness by using visual aids such as plate cultures taken from various pieces of machinery and even from the cuffs of the girls' white coats.

Finally, the microbiological laboratory is carrying out a survey of the type of organisms usually associated with English fresh fruits and has been responsible for the introduction of the flash pasteurising of Ministry orange juice, since when no trouble whatever has been encountered with fermentation in this product. This is the only factory in Great Britain where this process is used for this particular product.

Vitamin Survey

An interesting vitamin survey is in the process of being carried out under the guidance of Dr. Charley. The scheme began by an idea to estimate the vitamin C status of a cross-section of the Forest of Dean, and to help with this survey he has had the wholehearted co-operation of members of the company's staff, of members of another factory in the Forest manufacturing plastic board, of children from the schools at Coleford and Lydney, and of miners from one of the collieries—in all a total of 600 volunteers.

Advice on the scientific aspect of the survey was sought from and freely given by Professor John Yudkin, of King's College of Household and Social Science, and in March, 1948, the team started work.

The scheme is to operate over a period of one year, and prior to its start all the subjects received a medical examination, specific attention being paid to conditions of the skin and gastric disorders, and, so far as possible, a record of their susceptibilities to coughs and colds. The children were weighed, measured, and had X-rays taken of their teeth. The first week consisted of a massive dose technique administered in tablet form to saturate all the subjects with vitamin C. At the end of this period the volunteers were divided into two groups and vitamin C in natural form is being administered at different levels, so that the results can be compared and will give a true statistical analysis. At the end of the year's survey the medical examinations will be repeated, and in the meantime careful records are being kept of absenteeism due to coughs and colds.

Apple Juice

In the production of apple juice only hand-sorted apples are used. To ensure highest quality fruit only being used, these are sent to the factory in open apple boxes and not in sacks. Bramley's Seedling and a certain proportion of lower acid eating apples are used for processing. These reach the factory from Kent and the West Midlands in quantities up to 1,000 tons in the season according to the crop and the demand. No cider apples are used in view of the company's desire to prevent any chance of mistaking apple juice for cider!

After washing, the apples are milled in a special Swiss mill and led through a special Pyrex assembly giving a continuous filling operation into the cloths. Wooden racks and the orthodox hemp cloths are used, but considerable success is being achieved with the use of nylon cloths which have hard-wearing characteristics and are cleaner in operation. Plastic racks are also being examined in view of the

brittleness of wood and the difficulty of sterilising wooden racks.

The "cheeses" are led to two vertical hydraulic presses in which the juice is expressed. The residue from the cloths is then disintegrated and blown to another floor for feeding into a rotary drier of the orthodox type of heating with steam tubes, and is blown through the length of the press hall for cooling before automatic weighing and filling into bags. This material is sold for pectin manufacture.

The juice is collected in stainless steel tanks in a duct carrying all the services underneath the main processing rooms in the factory. It is immediately cooled in another room set apart for apple juice clarification, clarified, and passed through a CO_2 impregnating machine into the tanks in the cold store.

The cold store, which was literally blasted out of solid rock, is unique in Great Britain. It holds forty-four 5,000 gallon glass-lined tanks which have specially designed fittings. The juice is maintained under a low pressure of CO_2, at a temperature near to freezing point.

One of the research laboratories.

Pre-bottling Procedure

When required for bottling, the juice is blended several weeks before bottling date, and is passed to a balance tank in the bottling room under such conditions of pressure that the final filtered, bottled product shows only a slight carbonation. The juice is filled into 20, 10, or 5 oz. bottles and fed automatically into a continuous pasteuriser capable of dealing with 300 dozen per hour. The Shloer apple juice is then labelled and put into store.

A unique line of apple juice is put out in six-gallon containers with specially designed closures. This line is run as a sterile product and is not treated by heat at any stage of its manufacture. In fact, the consumer can drink the juices, knowing that from within a few hours of the apples being milled until it is consumed the juice has been maintained at a low temperature. These containers are despatched through cold stores to specially designed dispensing stations where the juice can be sold at an attractively low temperature.

In seasons of heavy crops it is often desirable to produce a bulk of concentrate to ease storage space. A triple effect climbing film evaporator in stainless steel is installed for this purpose. It has an input of 350 gallons per hour and is housed in a four-storey section of the factory. The evaporator is fitted with a special device for separation of volatile constituents which proves very effective in the case of apple and most soft fruits.

Blackcurrant Processing

In view of the very short blackcurrant season, the tonnage of fruit needed for Ribena production could not be economically processed in the five weeks available. Consequently a certain proportion of the fruit is canned in A.10 cans both in the west of England and East Anglia by established canning factories, this material being converted into juice as soon as possible after the fresh fruit season is over.

The blackcurrants are grown in plantations established by existing fruit growers solely for supply to the company. A ten-year contract is given them with suitable price characteristics, but the contract also includes certain conditions which must be fulfilled regarding varieties to be grown, spacing of bushes, manurial and spraying treatments, and certain restrictions concerning inter-cropping. The desire of the company in this respect is to ensure that every grower obtains a really first-class crop. To this end, two Field Officers, Mr. F. D. Atteridge and his assistant, Mr. J. Webb, spend their whole time in the counties with the various growers.

The usual wicker baskets or wooden boxes used for fruit trays did not meet with the company's approval and they have therefore developed, in collaboration with the manufacturers, an aluminium tray, holding 28 lb. of fruit, which has proved to be of great value in achieving clean delivery of fruit to the factory. The trays can be cleaned by steam before being returned to the grower, and stacking eight high is a simple matter.

After passing through the grater mill, the fruit is treated with pectinase enzyme in six stainless steel tanks each holding five tons of fruit.

The "cheeses" are established at two building platforms, using a Pyrex delivery and by-pass arrangement. The same pressing equipment is used for apples, and the pomace is eventually dried as for apple.

Storage Conditions

The juice is centrifuged through a battery of machines into pans and passed through the impregnating pump into tanks in the cold room. Storage under these conditions is extremely efficient with regard to the retention of flavour and ascorbic acid. When needed, the juice is pumped into the processing rooms for syruping, filtering, and passing through a Pyrex pipeline the whole length of the factory to a balance tank adjacent to the apple juice filling unit, where filling is carried out, followed by pasteurisation and labelling as for apple juice.

Throughout the whole process strict technical control is exerted by the laboratories, and the en-

Inside the microbiological laboratory.

gineering department is responsible for seeing that only suitable materials are used for machines and vessels which come into contact with the products.

Rose Hip Processing

Rose hips are obtained from several West of England counties and Scotland. The extract from the latter area is between two and three times as great as that from the southern part of England. Hips are collected by schools, W.V.S., Scouts, Girl Guides, etc., and are sent to the factory in sacks of varying sizes. Milling takes place immediately on arrival at the factory, followed by extraction with boiling water in stainless steel percolators of special design. The use of boiling water is essential for this purpose so that the enzyme systems which might otherwise cause a loss of ascorbic acid due to air contact can be inactivated as quickly as possible. The extract from English hips is extremely viscous and, in view of the fact that the concentration has to be taken to a relatively high degree, the viscosity must be reduced by pectinase action. After this, the extract is centrifuged to remove the *débris* of tissue and the fine hairs.

The clarified extract is slightly sweetened with sugar and concentrated through the evaporator without making use of the ester separator. In a very highly concentrated form this extract can be maintained with a negligible loss of ascorbic acid over twelve months, but this is only the case if storage is carried out at 0° C.

This raw material can quite simply be built up into a finished syrup of a composition similar to that initiated by the Ministry of Health during the war. One of the difficulties in dealing with rose hips is the instability of some of the organic constituents, and the laboratories are still studying the nature of these substances and how their stabilisation can be effected.

Canned Apples

In due season apples are canned at the factory. These, on arrival, pass through the automatic peeling and coring machines. After trimming and cleaning by the operators, the apples are automatically seeded and sliced and fed into brine vats, where they stand for twenty-four hours before canning. At the conclusion of this period the sliced apples are tipped into wire baskets for washing to soak off the brine, and then pre-heated. This treatment allows the fruit to be "suppled up" so that 6 lb. may be packed into a can more easily. The cans, after filling, are check-weighed and then conveyed to the exhaust box, where they are processed at the usual temperature. After seaming, the cans pass automatically into the cooker and cooler. Cooking occupies fifteen minutes and cooling about forty-five minutes, after which the cans are packed for despatch. The waste material is converted into a fine sieved *purée* which is also packed in A.10 cans.

Other fruits dealt with in this department are rhubarb, cherries, blackcurrants, loganberries, plums, blackberries, raspberries, strawberries, and pears, the packed product being for caterers only.

Fruit Squashes

Barrels of citrus juices come from Palestine, West Indies, South Africa, Sicily, and Spain. All barrels on arrival at the factory are washed, and samples taken for testing. The squashes are prepared on a "balcony" floor above one end of the filling room and are fed by gravity into the filling machines lined up on the floor below.

The Ministry of Food orange juice is also handled in this department, the imported canned concentrated juice being processed in an entirely separate stainless steel plant. From the containers the juice is blended according to the ascorbic acid content and transferred to a multi-sectioned vessel, three departments for the juice and one for the sugar syrup. After standardising, the juice is pumped through to the flash pasteuriser and fed by gravity to the bottling and labelling department below.

Bottling Section

The bottling section comprises four main series of lines. Bottles for Ribena are washed, passed by conveyors to the vacuum filler and capper, and so to the in-bottle pasteuriser, after which the bottles are labelled. The procedure for apple juice is similar, except that the juice is filtered before filling.

The central bottling lines deal with squashes and, after passing through the four-head fillers, the bottles are automatically labelled. Squashes and cordials in one-gallon jars are handled in the third section of the bottling room and the Ministry of Food orange juice filling machines complete this extensive section of the factory.

Cartons for packing the completed products are passed by chute from an upper floor to meet the

various lines of finished products. The stock room is immediately adjacent to the bottling room, and the despatch dock, capable of dealing with seven lorries simultaneously, leads off the stock room.

The welfare of the factory workers has not been neglected, a well-equipped surgery where many employees are dealt with daily being in charge of Miss Armstrong. All new employees are given a medical examination and the physician from the local hospital is present every Monday to advise generally on health matters. An excellent canteen is provided for staff and the company is endeavouring to promote social activities among its personnel.

With regard to the export position, until last year the export of Ribena was not agreeable to the Ministry of Food, and in consequence no attempts could be made to explore the foreign market for this product, but great activity is taking place at the moment with regard to the marketing of this product in many parts of the world, including America and Canada. An increasing export market is being found for rose hip syrup and the whole range of citrus squashes.

SUPPLIERS OF EQUIPMENT

Water pump: *Harland and Wolff, Ltd.*
Evaporator: *Kestner Evaporator and Engineering Co., Ltd.*
Boilers: *John Thompson, Ltd.*
Trucks: *H. C. Slingsby, Ltd.*
Apple washer: *Geo. Adlam and Sons, Ltd.*
Apple mill: *Bucher-Guyer (Zurich).*
Rack washer: *Sutter (Switzerland).*
Apple presses: *H. Beare and Sons, Ltd.*
Rotary drier: *Richard Simon and Sons, Nottingham.*
Filters: *George Adlam and Sons; John C. Carlson; Metafiltration, Ltd.*
CO_2 impregnating machine: *Sulzer Bros., Ltd.*
Storage tanks: *R. Marsh and Co.*
Prodor-Glas lined tanks: *Prodorite, Ltd.*
Refrigeration: *York Shipley, Ltd.*
Sterilising pads: *T. B. Ford and Co.*
Pasteuriser: *George Adlam and Sons to design of Nyböe and Nissen of Denmark.*
Trays: *Brabys of Bristol.*
Pumps: *Mono Pumps, Ltd.; Howard Pneumatic Engineering (Eastbourne).*
Cyclone: *H. Beare and Sons, Ltd.*
Stainless steel tanks: *A. Johnson and Co., Ltd.*
Percolators: *George Adlam and Sons.*
Mixing pans: *T. and C. Clark and Co., Ltd.*
Centrifuges: *Sharples Centrifuges, Ltd.*
Mills: *S. Stowe; H. Beare and Sons, Ltd.*
Fillers: *Albro Fillers and Engineering Co., Ltd.; Bancroft Fillers, Ltd.*
Apple peeler and corer: *Mather and Platt, Ltd.*
Exhaust box: *G. C. Engineering Co., Ltd.*
Seamer and cans: *Metal Box Co., Ltd.*
Sieving machine: *A.P.V. Co., Ltd.*
Seeder and slicer, cooker, and cooler: *Mather and Platt, Ltd.*
Packing cartons: *Thompson and Norris, Ltd., Medway Containers.*
Wire strapping: *Fredk. A. Power (Box Strapping), Ltd.*
Flash pasteuriser and multi-sectioned vessel: *Burnett and Rolfe.*
Carton stitching: *Brehmer Stitcher.*
Closures: *Metal Closures, Ltd.*
Bottle washers: *British Miller Hydro Co., Ltd.*
Labelling: *Purdy Patent Machinery Co., Ltd.*
Bottles: *United Glass Bottle Manufacturers, Ltd.; Rockware; Lumbs of Castleford.*

Processing of Citrus Juices

AN ADDITION to the sparse technical information available on citrus juice processing has made a welcome appearance in the shape of a new textbook* on this subject. It is particularly pleasant to know that technicians from Israel are going into print on subjects in which they have become expert and, although this particular textbook was printed in America, it is to be hoped that in due course a series of similar books will become available to the world from the printing presses of their own country.

Comprehensive Treatment

In the past, information regarding citrus products in general has had to be sought in more general communications of which citrus juices and allied products formed only a part, but now technicians throughout the world have been presented with a story which is comprehensive in most of its treatment of products won from the citrus crops, and which includes information of the most up-to-date nature on all aspects of this important type of food.

The author has made a valiant attempt to provide a textbook which deals both with the complex chemical story of citrus oils and pectin, and with the actual technological considerations involved in the processing of all these materials. The whole book bears the impress of authority and, although the detailed treatment is by no means sufficient to satisfy the needs of research workers on the subject, it provides a most valuable digest of the present state of our information on the salient chemical and technical features of the industry.

There are few omissions of note; for example, very little is said about the enormous popularity of pure orange juice in the North American continent or the growing industry connected with this product in Israel itself. Canning does not get the detailed treatment which, in the reviewer's opinion, it deserves, for surely any technician interested in juice products would welcome a clear exposition of the present state of knowledge regarding the canning of all types of citrus juices. This is the more strange considering that Israel has been in the forefront of the newer producers in seeking to develop a market in Great Britain for canned juices ready for immediate consumption.

It used to be, and still is, a criticism of American textbooks that they tend to develop along parochial (or national) lines, rather suggesting the idea of the great Dr. Jowett, who said: "What I don't know is not knowledge," but doubtless, in due course, this particular deficiency can be remedied.

The book contains one or two very comprehensive expositions on the chemistry of citrus products, among which may be cited the author's treatment of pectin. The printing is of a very high standard, and the book is pleasant to read, easy to follow, and gives one the impression that great care has generally been expended on its production.—V. L. S. C.

* *Citrus Products: Chemical Composition and Chemical Technology.* By J. B. S. Braverman. Pp. 424+xiv. Interscience Publishers, New York and London. Price 54s.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," November 1, 1949, page 494.

No.	*Date 1949*	
		PRICE FIXATION
1818	Oct. 1.	The Ware Potatoes (1949 Crops) No. 2) Order, 1949. Revokes S.I. 1948, No. 2200; 1949, Nos. 121 and 407; 1949, No. 1459.
1823	,, 2.	Order amending the Cereal Fillers (Control and Maximum Prices) Order, 1944. Revokes S.I. 1948, No. 869.
1868	Nov. 27.	Order amending the Flour Confectionery (Control and Maximum Prices) Order, 1946.
1869	,, 9.	Order amending the Milk (Control and Maximum Prices) (Great Britain) Order, 1947. Revokes S.I. 1949, No. 1727.
		CURRY POWDER
1816		The Food Standards (Curry Powder) Order, 1949. Coming into operation (*a*) as respects sales by the manufacturers, Apr. 1, 1950; (*b*) as respects sales by wholesale, July 1, 1950; and (*c*) as respects sales by retail, Oct. 1, 1950.
		FLOUR
1742	Oct. 1.	Order amending the Flour Order, 1947.
1779	Sept. 25.	Order amending the Flour Order, 1947.
		FRUIT
1555	Aug. 23.	Order revoking the Pears Order, 1948.
		GRAIN
1525	Aug. 28.	Order amending the Pulse (Control and Prices) Order, 1943.
1748	Sept. 25.	Order amending the Rye (Great Britain) Order, 1949, and the Rye (Northern Ireland) Order, 1949.
		HOME-GROWN GRAINS
1395	Aug. 1.	The Home-grown Grains (Sack Charges) Order, 1949.
		INFANT MILK FOODS
1900	Oct. 16.	Order amending the Proprietary Infant Milk Foods Order, 1947.
		LABELLING
1536	Aug. 20.	Order amending the Labelling of Food Order, 1946.
		MANUFACTURED AND PREPACKED FOODS
1498	Aug. 7.	Order revoking the Manufactured and Prepacked foods (Control) Order, 1942.

No.	*Date 1949*	
		MEALS IN ESTABLISHMENTS
1675	Sept. 9.	Order amending the Meals in Establishments Order, 1946. Revokes S.I. 1948, No. 1563.
		MILK
1587	Oct. 1.	The Food and Drugs (Milk and Dairies) Act, 1944 (Appointed Day) Order, 1949.
1674	Sept. 11.	Order amending the Milk (Control and Maximum Prices) (Great Britain) Order, 1947. Revokes S.I. 1949, No. 1287.
1727	,, 18.	Order amending the Milk (Control and Maximum Prices) (Great Britain) Order, 1947. Revokes S.I. 1949, No. 1674.
		NUT KERNELS
1514	Aug. 14.	Order amending the Nut Kernels Order, 1947.
1585	,, 28.	Order amending the Nut Kernels Order, 1947.
		PICKLES AND SAUCES
1396	July 31.	Order revoking the Pickles and Sauces Order, 1947.
		POINTS RATIONING
1326	July 17.	Order amending the Food (Points Rationing) Order, 1949.
1523	Aug. 14.	The Food Rationing (Personal Points) Order, 1949.
1528	,, 14.	Order amending the Food (Points Rationing) Order, 1949.
1684	Sept. 11.	Order amending the Food (Points Rationing) Order, 1949.
1876	Oct. 9.	Order amending the Food (Points Rationing) Order, 1949.
		RATIONING
1325	July 17.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1949.
1386	,, 31.	Order amending the Meat (Rationing) Order, 1949.
1495	Aug. 21.	Order amending the Bacon (Rationing) Order, 1949.
1496	,, 14.	Order amending the Sugar (Rationing) Order, 1949.
1526	,, 14.	Order amending the Food Rationing (General Provisions) Order, 1949.
1584	,, 1.	The Feedingstuffs (Rationing) Order, 1949. Revokes S.R. & O. 1943, Nos. 1498 and 1691; S.R. & O. 1946, No. 1490; S.R. & O. 1947, No. 1990; S.I. 1948, No. 650; S.R. & O. 1945, Nos. 577 and 1596; S.R. & O. 1947, No. 1626; S.R. & O. 1947, No. 1861.

The Milling Industry

Progress in 1949

A. J. AMOS, Ph.D., B.Sc., F.R.I.C.

The present annual review of the milling industry is the fifth that has been written since the end of the war, and yet it is still necessary to report the continuance of strict governmental control. Millers are still obliged to work to a prescribed grist, the imported wheats of which are allocated to them by the Ministry of Food, which continues to do the wheat buying. From this grist the millers are still required to mill a straight run flour of 85 per cent. extraction. It is true that the technological problems presented by the necessity to mill to 85 per cent. extraction led to an almost revolutionary revision of milling practice, and a consequent marked advance in technology, but the protracted continuance of this fettering of the industry will undoubtedly tend to stifle enterprise and pride of craftsmanship.

DESPITE the increased acreage under wheat in Great Britain as a result of the war-time policy, the major proportion of our wheat requirements still need to be imported. Our first need is, of course, strong and proteinous wheats suitable for blending with our weak native wheat. In addition to wheats capable of carrying the weak English wheat, however, wheats which, although not strong enough to carry English, are nevertheless sufficiently strong to require no support from stronger wheats, are necessary. Such wheats, which are used to supplement the basic mixture of strong wheat and English wheat, are known as "fillers." There is a considerable range of wheat types which can be and are used as fillers, but the basis of the strong group of the grist is always Manitoban wheat from Canada, and indeed subsequent to the outbreak of war occasions have arisen when Manitoban and English have been the only wheats in the blend. It is understandable, therefore, that Manitoban has been referred to as the backbone of the British miller's grist.

Grading Systems

An official grading system is in operation in Canada. Grade No. 1 represents the best wheat, and the standard of quality and the price of the other grades diminish as the grade number increases numerically. Throughout the year under review the Manitoban wheats which were imported by the Ministry of Food ranged from grade 1 to grade 4, but, whereas in the previous year comparatively little No. 1 Manitoban was imported, a high proportion of the 1949 importations consisted of the top grade. Arrivals of this grade and of grade No. 2 together greatly exceeded the arrivals of grades 3 and 4. In the discussion of these Manitoban wheats which follows, the strength and stability figures quoted to illustrate statements in the text will have been provided by an Alveograph, a well-known mechanical dough-testing instrument particularly suitable for evaluating wheats.

Manitoban Wheats

Throughout 1949 the arrivals of grades 1 and 2 Manitoban wheats differed little in gluten quality, but the top grade showed, on average, a superiority of protein content to the extent of about 0·5 units per cent. Average samples of each grade were wheats of good strength with nicely balanced proteins which had a satisfactory carrying power for weak wheat. Unfortunately, however, in the first few months of the year, and again during the autumn, some cargoes were received which were much below standard. The autumn arrival of these Manitoban wheats of very poor quality was a matter for serious perturbation and the issue involved will be discussed later.

Grades 3 and 4 usually did not differ widely in strength and protein content, but in both these characteristics were inferior to the two top grades. On the whole, the wheats of grades 3 and 4 showed reasonably well-balanced protein characteristics for these grades. Their glutens were stiffer and less elastic than those of grades 1 and 2 but, on the other hand, did not show the pronounced "deadness" and lack of stretching power which has often characterised the wheats of these grades in past seasons. During the previous year cargoes of "Special No. 4 Grade" wheats were received which proved to be superlative wheats for No. 4 grade in protein content and strength, but these were not seen to any extent in 1949.

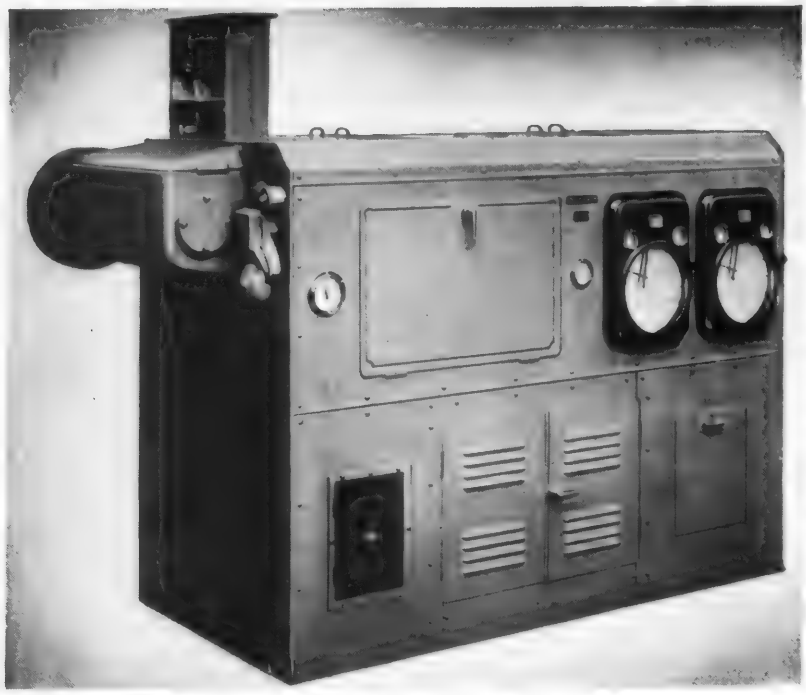
Owing to the situation which developed in the autumn the mean data selected to portray the relative baking and blending values of the general run of wheats in the four grades are those derived from the cargoes received during the first nine months of 1949. These data are:

TABLE I

MEAN DATA OF MANITOBAN WHEATS IMPORTED DURING FIRST 9 MONTHS OF 1949.

Grade.	*Protein per cent.*	*Stability.*	*Strength.*
No. 1	13·73	104	74
No. 2	13·37	106	72
No. 3	12·55	109	65
No. 4	12·55	113	65

The disturbing situation which developed in the autumn of 1949 relates to the abnormally poor quality of some cargoes of Vancouver wheat. Manitoban wheats are designated as "Atlantic" or "Vancouver," according to their ports of shipment, and it has been well recognised in the milling industry that the wheats shipped from



The stabiliser. A new development in conditioning in which steam-heated wheat is cooled suddenly by immersion in cold water.
Photo Henry Simon, Ltd.

the Pacific side are, as a class, inferior in baking quality to the Atlantic wheats. In the author's experience, however, never before has the inferiority of the Vancouver type No. 1 grade been of the order revealed by a number of cargoes received during the autumn of 1949. Although the wheats in question had been graded No. 1, their strength figures were not even in the Manitoban range; some of the samples were no stronger than a good Rosafe Plate wheat, which meant that they had no carrying power for weaker wheats but could serve only as "fillers." The protein contents of these wheats were also much below the standard of the top grade. The data of Table II reveal the completely unsatisfactory nature of these Vancouver wheats graded as No. 1.

The phenomenally poor quality of these top grade Manitoban wheats received from Vancouver in the autumn presented the milling industry with a very serious situation. At that time the official grist contained 40 per cent. English wheat and it was therefore most important that the Manitoban portion of the blend should contribute the quantity and quality of protein needed to carry this high proportion of weak English wheat. It would be hopeless, however, to expect even a moderately satisfactory flour of 85 per cent. extraction from a grist containing 40 per cent. English wheat if a good proportion of the strong group consisted of these poor Vancouver No. 1's.

Reasons for Poor Quality

It would seem that the abnormally poor quality of these Vancouver arrivals may be largely due to the abnormal combination of weather conditions that prevailed during the crop year in question, although the presence of the variety Red Bobs may be a contributory factor in some instances. The perturbing feature of the situation is, however, that these wheats could be graded as No. 1. The British miller has come to expect, and rightly so, a certain standard of quality in Manitoban wheat which has been graded as No. 1, but his faith in this wheat will be greatly shaken if he is to learn that the system of grading permits wheats sufficiently abnormal to be right outside the Manitoban range of strength still to be graded as No. 1. It is true that grading cannot wait upon determinations of gluten quality, but surely the dullness, the high proportion of yellow berries, and the distinctly low protein content of these particular wheats might have been sufficient pointers to their probable ineligibility for the top grade?

Another reasonably strong wheat which was imported from Canada in 1949 was Garnet. This wheat was not quite as strong as the normal No. 1 and No. 2 grade Manitoban, but it was as strong as the No. 3 and No. 4 grades, and hence was sufficiently strong to carry weak wheat. Its protein, however, is not well balanced; it is stiff and only moderately distensible, and too much of this wheat in a blend will detract from the liveliness of the dough made from the resulting flour.

Durum and Garnet Wheats

Cargoes of Durum wheat were also received from Canada. These wheats were fully as proteinous as the No. 2 grade Manitoban but were much weaker. They were not strong enough to carry weaker wheats. Their proteins resembled those of Garnet wheats in balance of characteristics, being stable and deficient in stretching power.

Mean data for the Garnet and Durum wheats received during the year are shown in Table III.

TABLE II

MEAN DATA OF ATLANTIC AND VANCOUVER NO. 1 MANITOBAS IMPORTED DURING OCTOBER AND NOVEMBER, 1949.

	Atlantic No. 1.			*Vancouver No. 1.*		
	Protein per cent.	*Stability.*	*Strength.*	*Protein per cent.*	*Stability.*	*Strength.*
October arrivals	14·02	110	74	13·06	100	59
November arrivals ...	13·91	112	73	11·97	97	54

TABLE III

MEAN DATA OF GARNET AND DURUM WHEATS IMPORTED DURING 1949.

	Protein per cent.	*Stability.*	*Strength.*
Garnet	12·36	122	65
Durum	13·50	111	45

A strong wheat imported from America during 1949 was Northern Spring. This wheat was as pro-

teinous as No. 2 grade Manitoba but in strength was not quite up to the standard of the No. 3 and No. 4 grade Manitoban. It had, however, a useful strength and carrying power, and usually the protein characteristics were satisfactorily balanced. A few samples of Northern Spring contained small quantities of ergot, while others were heavily contaminated with foreign seeds, among which were found a few seeds of melilot. Mean data for the Northern Spring cargoes were: protein 13·51 per cent., stability 96, strength 60.

Another American wheat which was imported during the year was Hard Winter. This, however, is a different class of wheat from American Northern Spring. It is appreciably lower than the latter in protein content and strength. It has no carrying power for weaker wheat but has sufficient strength to be classed as a filler. Mean data were: protein 12·25 per cent., stability 86, strength 46.

Dominion and English Wheats

A Canadian wheat of the filler type which was imported during the year was Alberta Red Winter. This wheat was not quite as strong as American Hard Winter and would be regarded as only a moderate filler because it requires a little support from stronger wheat. The gluten of this wheat tended to be rather stable for the strength and thus rather lacking in liveliness. Mean data were: protein 12·14 per cent., stability 83, strength 40.

The Australian wheats imported during 1949 were vastly superior to many of those received during 1948. Many of the 1948 importations of Australian were thin, shrunken wheats showing much sprout and excessive diastatic activity. The 1949 Australians, however, were sound wheats of satisfactorily low diastatic activity which furnished normal data for this type of wheat. Australian wheat has always shown a wide range of data, but on the basis of mean values it is about on a par with English wheat. Mean data for 1949 cargoes were: protein 9·94 per cent., stability 56, strength 21.

English wheat also shows quite a wide range of strength and protein content, but even the best samples would be classed as weak wheats. Used in a baking flour grist, these wheats need to be carried by strong wheats, such as Manitoban, but they are admirable on their own when a soft, weak flour is required, as, for example, by the biscuit manufacturers. Mean data for a very large number of samples analysed during 1949, which would include 1948 and 1949 crop wheat, were: protein 9·52 per cent., stability 51, strength 16. The 1949 crop was superior to that of 1948 in that it was sound and free from sprout. In consequence, the diastatic activities of the wheats received from August onwards were distinctly lower than those of the native wheats received early in the year.

Wheat Grists

The wheat grists employed for the production of bread-making flour are fixed by the Ministry of Food. It would be impossible to operate any given grist the whole year through; the composition of the official grist at any time is determined by the natures and quantities of imported wheats arriving or in stock and the supply position of English wheat. Obviously the official grist will contain a higher proportion of native wheat in the early autumn, when the new crop is coming in, than in the late spring, when the previous crop is tailing off.

During most of 1949 the official grist instructions for bread-making flours took the form of statements of maximum limits for Manitoban and Australian wheat and a minimum limit for English wheat. The quoted figures summed to less than 100 and the difference could be made up at the miller's discretion by the use of additional native wheat and allocated imported wheats other than Manitoban, such as American, Garnet, and Durum. In May the maximum Manitoban content and the minimum English content of the official grist were respectively 50 per cent. and 15 per cent., while in September the corresponding figures were 40 per cent. and 40 per cent. The Australian content varied from 17½ per cent. to 10 per cent. There were no restrictions upon the proportion of English and Australian wheat used in grists for the production of flour intended for purposes other than bread-making.

Rate of Extraction

Throughout 1949 the rate of extraction continued at 85 per cent. At one time there was some talk of an early reduction to 82½ per cent. or 80 per cent. but, following the advent of yet another economic crisis, expectations faded. It is true that a reduction in the rate of extraction would necessitate the purchase of more wheat from other countries, but against this must be set the reduction in purchases of feedingstuffs due to the increase in supplies of home-milled wheat offals.

The pride of craftsmanship which characterises the millers of Great Britain has led to technological developments which enable a flour of 85 per cent. extraction to be produced with a reasonably white colour. Flours of this extraction, no matter how good their colour, do not, however, handle so pleasingly or behave so well in the

The Chopin alveograph.

bakery as do lower extraction flours, and particularly is this so on automatic plants. When the detrimental effect of long extraction on dough quality is superimposed upon the lack of quality arising from a poor wheat grist, as happened during the autumn of 1949, then the baker is greatly handicapped. Much of the unsatisfactory commercial bread which was produced during this period might have been avoided, even with the poor grists, had the extraction rate been reduced.

Throughout 1949 the compulsory inclusion in each sack (280 lb.) of flour of 14 oz. of *creta praeparata* continued.

Flour Quality

The 1949 crop of English wheat was much superior to the 1948 crop from the point of view of general soundness; much of the 1948 crop was sprouted, whereas the 1949 wheat was dry and ungerminated. These differences led to an appreciable change in the diastatic activity of National flour as the 1949 native wheat became available. In the earlier part of 1949, when the English wheat of the 1948 crop was being used, maltose figures were generally high, and flours of undesirably high diastatic activity were not infrequently encountered. In the autumn, however, when the English wheat in the blends was of 1949 vintage, maltose figures were very much lower and, in a number of instances, were lower than is desirable. For the first time for several years, therefore, it became advisable at some mills for malt flour to be incorporated in the flour.

Effects of Malt Additions

In the late summer there was another reason for the necessity of adding malt flour at a number of mills. The flours in question were not necessarily low in diastatic activity, and hence not in need of a stimulus to gas production, but they gave doughs which felt rather dead and sluggish and which consequently did not show the lively response to manipulation and the oven development desired by the baker. The beneficial effect of a malt addition upon such flours was due not to the diastatic but to the proteolytic enzymes of the malt, which helped to mellow the gluten and thus to make the dough more lively. The lack of life calling for correction in these doughs was usually not attributable to the nature of the wheats in the blend but to the presence of an undue amount of bran powder. The reason for this defect was the moisture content at which the wheat had been milled. It is true that the exceptionally hot dry summer, with the consequent increased evaporative loss on the mill, may have been a contributory factor, but in a number of mills the wheat was being milled too dry. Numerous flours showed moisture contents 1 per cent. below the desirable level.

As the autumn advanced and the proportion of home-grown wheat in the blend was increased, the protein content of the flour decreased. The drop was aggravated in some instances by the use in the blend of one of the poor Vancouver wheats of low protein content. When a significant reduction in the protein content of flour occurs, it may happen that some readjustment of the chemical treatment is called for, since the level of treatment suited to the initial protein content may be too great for the reduced amount of protein. It is perturbing, therefore, when the protein content of a flour unexpectedly drops appreciably owing to the use of a wheat the abnormally low protein content of which is unrealised. Fortunately, however, only a few instances of over-treatment were encountered at this period.

Flour Treatment

Although, as stated in last year's review, flour treatment with nitrogen trichloride has been shown to have no ill effects upon humans, the move initiated by the millers in America to have chlorine dioxide substituted for nitrogen trichloride in the list of permitted flour treatments was successfully concluded. No action has, however, been taken in Great Britain.

Since it has been established that nitrogen trichloride-treated flour is without ill effect upon human beings, the peculiar power of such flour to give rise to running fits in dogs has become a matter of little more than academic interest. Investigation into the problem has, however, continued, and towards the end of 1949 a team of workers at the Research Association of British Flour Millers announced the isolation of a crystalline toxic factor from zein which had been treated with nitrogen trichloride. This factor, which was obtained from several batches of treated zein, was toxic to rabbits in doses of the order of 2 mg. The toxicity was maintained on crystallisation from aqueous alcohol and the purified crystals had a melting point of 232° C.

Work on the subject is also proceeding in America and there is reason to hope that identification of the toxic factor may not be unduly delayed. It is possible that one result of the work which has been concentrated on this problem will be to shed more light on the *modus operandi* of chemical improvers.

Use of Persulphates

The replacement of nitrogen trichloride by chlorine dioxide in the list of substances permitted in flour in America has raised the question of other forms of flour treatment, and in recent hearings on the subject the possibility of using persulphates has been discussed. These salts are excellent flour improvers and are in use in Great Britain; they increase the strength and stability of a dough without imparting to it undue toughness. In fact a flour correctly treated with persulphate is particularly lively. The powder improvers, such as ammonium persulphate and potassium bromate, which is already permitted in America, are, however, at a disadvantage compared with gaseous improvers, such as nitrogen trichloride or chlorine dioxide, since the overall effect of a given dosage of them cannot, as in the case of the gaseous improvers, be varied according to the manner in which the total treatment is distributed between the flour divides.

Incidence of Dermatitis

The discussion in America of the use of persulphates as flour improvers has raised again the old question of the effect of the widespread use of these substances in flour on the incidence of dermatitis among bakers. It is right and proper that all facets of the problem should be investigated and the fullest information obtained before

a decision is made. In England the answer is plain. Ammonium persulphate has been in use as a flour improver in this country since 1916, during which period the annual usage for this purpose was, for a number of years, in the region of 40 tons. Despite this large usage of persulphates in flour there is no evidence that there has been a significant increase in dermatitis throughout the baking industry subsequent to the introduction of this improver.

Flour Purity

No special developments have occurred during the year in relation to the problem presented by the presence of rodent hairs and insect fragments in flour. The American Food and Drug Authorities have not significantly relaxed their standards of tolerance for these contaminants in goods submitted as imports, and the white flour intended for the production of export biscuits continues to be made at a few selected mills at which special precautions are taken to avoid the presence of insects or rodents.

The rodent hair contamination of flour, however, derives in the main from the presence of rodent faecal pellets in the native wheat. Since these cannot be satisfactorily removed from the wheat by the normal wheat cleaning plant, rodent hairs will continue to be present in flour until such time as rodent contamination of the wheat at the farm is greatly curtailed, or alternatively a plant is designed which is capable of removing the rodent pellets from the wheat. Milling engineers have continued to work on this latter problem and some encouraging results have been obtained with trial machines. Further progress in this direction will not, however, lessen the desirability of effecting a cleaning up on the farm.

Prepared Mixes

For several years there has been a very wide sale in America of what are known as prepared mixes. These are packeted mixtures containing flour, milk solids, fat, sugar, egg solids, and aerating ingredients, together with salt, flavour, and colour. They call for the addition by the housewife of water only in order to make a high quality article, such as a cake, a pie, or a roll. Many firms in Great Britain concerned in the manufacture and sale of foodstuffs have evinced great interest in these prepared mixes, since there undoubtedly exists a large potential market, but any desire to develop such lines has been held in check by the supply position. Recently, however, such a product has appeared on the British retail market, although the declared formula is, as it must be under existing circumstances, leaner than many of the American formulae. As control of the ingredients eases, however, these prepared mixes will certainly increase in number and type and there is little doubt that flours of specified properties will be demanded for certain of these lines. In America the large milling firms manufacture, pack, and advertise these prepared mixes.

Dough Refrigeration

It is a precept of baking practice that a dough should never be allowed to become chilled. It seems strange, therefore, to find efforts being made to apply refrigeration to fermenting doughs. One important aspect of such a possibility is that it would meet some of the difficulties which would be created were night baking to be abolished. It would be possible to perform part of the dough fermentation in the afternoon and then to arrest the fermentation process by placing the dough in the refrigerator. The following morning the dough would be warmed up and the fermentation completed so that new bread would be available for early delivery.

Work in this field has led to the construction and commercial use of plants in which tinned doughs can be refrigerated over night at automatically controlled temperature and humidity, and then slowly warmed up at a prescribed time by the cutting out of the cooling unit. The author has seen bread produced from such refrigerated doughs which has been of very high quality.

The subject is not without interest to the miller inasmuch as investigation may reveal that the success of the refrigeration procedure may not be unrelated to certain flour properties.

Bread and Nutrition

A report of interest and importance to the milling industry appeared in the April 1949 issue of the *Canadian Medical Association Journal*. It was a report of a medical re-survey of nutrition in Newfoundland which had been carried out in 1948. At the time of the earlier survey in 1944 malnutrition was rife in Newfoundland, and therefore the long extraction flour of that period, which was unpopular, was replaced by American enriched white flour. This enrichment included aneurin, riboflavin, nicotinic acid, and iron. At the same time as the enriched flour was introduced vitamin A was incorporated in the margarine.

A comparison of the results of these two medical surveys, which were undertaken by a panel of eminent nutritional experts, left no doubt of the beneficial effect of the dietary change introduced in 1944. The outward signs of malnutrition were less conspicuous and less prevalent in 1948, and with the disappearance of these signs had gone much of the apathy and listlessness so characteristic of the population in 1944. Also, the death rate fell and infant mortality was strikingly reduced.

These facts would seem to disprove the argument that long extraction flour might contain certain important dietary factors which would be absent from enriched white flour. The author has always regarded this argument as very far-fetched and is not surprised to find that the Newfoundland experiment vindicates those who have advocated a full enrichment policy, and provides the answer to those who have suggested that such a policy might lead to some important dietary factor being neglected because of its presence only in long extraction flour.

Separation of Scutellum

It was established several years ago that the scutellum of the wheat grain, *i.e.* the membrane separating the germ from the endosperm, is extremely rich in vitamin B_1. Thus, although the scutellum accounts for only about 1·5 per cent. of the weight of the wheat kernel, it contains over 60 per cent. of the total B_1 found in the grain. It is obvious, therefore, that the level of the vita-

min B_1 content to be found in a long extraction flour will be markedly influenced by the manner in which the scutellum of the wheat is distributed between the flour and the wheat offal. Generally speaking, the milling systems in use today furnish a satisfactory level of B_1 in the national 85 per cent. flour and there is no call for special plant to segregate the scutellum and hold it back from the offal sack. Nevertheless, such a procedure might on occasions find a place in milling practice of the future.

Workers at the Research Association of British Flour Millers have turned their attention to this subject of segregating the scutellum during the milling operation and have obtained encouraging results. They tried several methods of separating particles of scutellum from admixed particles of endosperm and branny matter but finally adopted a procedure based upon differential adhesion to a moist surface; particles of scutellum and germ adhere much more firmly to a wetted surface than do particles of endosperm and bran. These workers designed and patented a machine capable of automatically effecting nine separate differential adhesion treatments to the stock fed to it.

Adhesion Treatment

The method of using this machine in a mill would be to feed to it those mill streams in which the scutellum was concentrated and then to send the resultant segregated scutellum to a finely fluted reduction roll. The essential parts of the machine are a moving, inclined, endless, rubber band, a spray of atomised water which impinges on the band, a heater, and two brushes, one soft and one hard, which can be adjusted to contact the band. The scutellum-rich stock is fed on to the ascending band shortly after the band has been moistened by the spray. The moisture is dried off by the heater under which the band, and the adhering particles, travels and the particles are subsequently removed differentially by the brushes. The soft brush removes the material which adheres fairly loosely to the band, while the succeeding hard brush removes the more firmly affixed particles.

(*Concluded at foot of next column*)

Trials with the prototype have given very encouraging results and attention is now being given to the construction of a commercial unit. What scope there will be for such a machine in the mill of the future will be dictated, however, by the final outcome of the deliberations of the conference on the post-war loaf—in other words, upon whether we have long extraction flour or white flour and enrichment.

Developments in Industrial Science

TEN years of development in industrial science are reviewed in a recently issued report* covering the change to war conditions.

The origin and early history of the Research Association movement are briefly mentioned as a preliminary to an account of searching examinations conducted by the Industrial Grants Committee in 1943 and again at later dates. The Committee was in no doubt at all that the general shape of the scheme was fundamentally sound and had been proved so by experience, but recommended a number of ways in which it could be improved.

Most of the recommendations have been announced and implemented — for example, the permanent collaboration between the State, represented by the D.S.I.R. and the Research Associations, and the making of capital grants for major expenses such as buildings or unusually expensive equipment. There are, however, several points of principle which are firmly declared; for instance, the high degree of autonomy essential to the success of a Research Association, the importance of contact between D.S.I.R. Stations and Associations, the bridging of the gulf between development of a new technique and its adoption in works practice, and the importance of leaders of the highest scientific ability being on the staff of the Research Associations. With regard to the latter the report says that freedom from routine duties, visits to centres of research both at home and abroad, and freedom to choose their own line of investigation should not be considered as taking them away from their work but as proper contributions to the work of the Research Association.

The position of Development Councils in industry is also mentioned, and the report states that contributions made to a Research Association either by a Development Council or as proceeds of an industrial levy will be regarded as grant-earning industrial income.

The study of the quality of foods and the means to avoid waste and to increase effective utilisation were considered by the Food Investigation Board to be an important feature of the actual programme of research. In considering the future scale of operations, the Board singled out for special attention the Torry Research Station, Aberdeen. Increase of the supply of good quality fish is one of the most ready means of adding to the nation's food supplies, and this depends on research on the treatment of the fish from the time it is caught until it reaches the consumer. Apart from this expansion, a steady growth was envisaged for the rest of the Food Investigation Organisation with a probable expenditure of £150,000 a year compared with the pre-war figure of £57,000 a year.

The chief factors limiting the development of the Department's plans have been shortage of staff and lack of suitable buildings; in consequence the Department must leave undone many projects which are worthy of attention and these, in general, are investigations of longer range. It has had to be the policy of the Department to concentrate its efforts on short-term investigations of obvious utility and on advisory work, using its stock of knowledge at the expense of longer range and more fundamental researches. The major problem of policy is the balancing of the need for giving assistance on problems of immediate and pressing importance and the need for providing the basis for more far-reaching advances in industrial technique and practice on which the continued prosperity of the country must ultimately depend.

* *Report of the D.S.I.R. for the Year 1947-8 with a Review of the Years 1938-48.* Pp. 103+iv. H.M.S.O., London. Price 2s. net.

Rennet and Cheese in New Zealand

Situated in the heart of the great dairying province of Taranaki, the New Zealand Co-operative Rennet Company plays an integral part in the cheese-making industry of New Zealand and, in addition to meeting the requirements of the industry, it also has a wide market overseas. This article outlines the history of this co-operative farmer-owned enterprise and describes its growth and volume and variety of production during the past 34 years.

Mount Egmont, at the foot of which is situated the factory of the Rennet Company. *Inset:* Some of the Company's products.

IN its early years the company, formed in 1916, suffered many vicissitudes, firstly through the lack of knowledge of the manufacture of rennet and secondly because of local prejudice. As time went on, however, better methods of manufacture were developed within its own factory and local prejudice was gradually worn down. In addition to rennet, subsidiary lines such as methylene blue, egg preserver, cheese colour, household rennet, and processed cheese in its varied forms and packs, are manufactured.

Rennet Production

The stomachs of many animals possess the power of curdling milk. Aristotle recommended the stomachs of deer for this purpose, but as time went on it was discovered that the stomachs of suckling calves gave the best results. At first the dried stomachs themselves were stirred into the milk to obtain a curd; then it was discovered that by soaking the stomachs in whey,

Part of the storage room where liquid rennet is stored in vats, each holding several hundred gallons.

The coopers at work completing a keg which will hold liquid rennet. All this class of work is done on the premises.

One of the operators at work on the machine for filling bottles with rennet tablets used in the manufacture of junket.

Part of the process for the conversion of Cheddar cheese into processed cheese.

the rennet solution thus obtained could be used. This was a great step forward making for better and quicker renneting of the milk, but the rennet solution was uncertain in strength, contaminated with bacteria, and quick to spoil.

With the rise of the factory system of cheese making, the need for more reliable rennet was seen, and attempts were begun to obtain the rennet enzyme from the stomachs in a purer and more dependable form. As early as 1843 a formula for the extraction of calf stomachs with salt brine — a principle upon which all modern rennet making is based—made its appearance in *Pierer's Lexicon*, published in Germany.

Production of rennet extract possessing the superior qualities demanded by the cheese maker of today requires broad scientific knowledge, manufacturing skill, and the use of modern, highly specialised equipment. Calf rennets must be chosen with care; the powerful milk-curdling enzyme secreted in the stomach of the living animal is produced only as needed. Only from the stomachs of calves fed wholly on milk can a large amount of curdling material be obtained; stomachs from calves deprived of milk are almost valueless.

It is estimated that 1,000,000 "bobby" calves are killed annually in New Zealand, and it is from the vells, or fourth stomach, of these suckling calves that rennet is made.

The vells are purchased in a dried state and are processed to extract the enzyme, this being stored in huge vats for a maturing period. At the end of a given time this is filtered, preservatives and other necessary reagents are added, and the rennet is then casked for use.

Rennet By-products

Rennet powder is a product which is finding favour in many countries outside New Zealand, where it is used for the manufacture of junket tablets and in cheese-

A further step in the manufacture of processed cheese. From this machine the cheese goes to the filling plant.

making in such countries as Cyprus, Greece, Egypt, Belgian Congo, Argentina, Australia, France, South Africa, and Denmark. It is also used in the manufacture of ice cream. The powder can be manufactured in any required strength and is packed in sizes varying from 15 g. bottles to 50 lb. bulk in tins.

This powder is also used in the manufacture of cheese tablets which can be used instead of liquid cheese rennet. A cheese tablet manufactured by the company is equal to one fluid ounce of cheese rennet and is packed in tubes of ten to a tube. Such a convenient form of packing can readily be sent by post, or shipped in cases which take up very much less shipping space than the ordinary liquid cheese rennet. Many countries prefer to use cheese tablets in place of cheese rennet and, because of their concentration in dried form, there is less likelihood of deterioration. Cheese tablets, when kept airtight and free from moisture, retain their strength over a very long period.

The company also manufactures large quantities of household rennet in the form of plain liquid, coloured and flavoured liquid, and as tablets.

Cooperage Section

So far as possible, the company forms a complete unit. From the point of view of economy and efficiency it is desirable to have kegs made within the plant, and the directors early decided to install the necessary equipment. The timber used in the kegs is entirely oak and New Zealand beech.

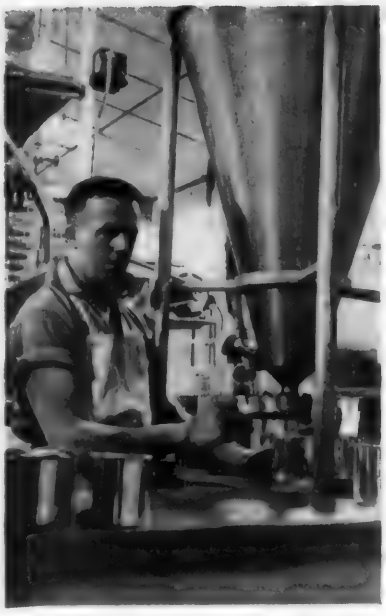
Rennet is a difficult liquid to hold and in consequence great care and skill must be exercised in the manufacture of the kegs.

Boxes needed for the packing of goods for export are also made on the premises, thus effecting a further economy.

Processed Cheese

During the second World War the company entered the processed cheese field and manufactured millions of pounds of the product for the United States Armed Forces in the Pacific.

A good processed cheese cannot be made from a poor quality Cheddar cheese. New Zealand generally manufactures a high quality full-



The processed cheese passes into cans for packing.

cream Cheddar cheese, rich in fat content, and the products of the best Taranaki cheese factories are used by the company. It comes into the factory as 80 lb. Cheddar cheese and the processing starts where the cheese manufacture ends.

Blending and Emulsification

Once the cheese arrives at the company's plant, it is stacked under controlled temperatures in the curing rooms. It is not matured to one standard, but rather to ensure that cheeses of different ages are blended in such a way as to bring about a uniform flavour. The emulsification of the fats renders the cheese resistant to temperatures up to 160° F. Whereas cheese in the ordinary Cheddar form loses a good deal of moisture, being dry and crumbly, with processed cheese there is no shrinkage, no rind, and no mould, so that the whole contents of each tin or packet can be used. This makes it eminently suitable for export to hot climates.

Thousands of tons of this commodity are packed each year and, in addition to supplying the local market in New Zealand, the company exports large quantities to overseas countries.

A separate large building, equipped with the latest machinery, is set aside for the manufacture of processed cheese which is kept under strict laboratory control.

The packs range from ¼ lb. in tinfoil to 10 lb. in tins.

Cheese Colour

Prior to the second World War the company supplied the whole of New Zealand's and a large part of Australia's requirements for cheese colour.

Cheese colour is a harmless vegetable dye, made from the seed of the Annatto plant, which grows principally in the West Indies, Java, and India.

The Annatto tree is laden with clusters of strawberry-red pods which, when harvested, are put out in the sun to dry. The heat of the sun opens the pods and it is the seed from these pods that is imported to make cheese colour.

As each batch of seed is extracted a careful test is made for strength and shade and the necessary adjustments are made until a uniform article is produced. An even quantity of cheese colour is used, and it is essential to give the correct shade required in each 1,000 lb. of milk processed. The finished article is stored in huge stainless steel vats whence the colour is poured into stout steel drums, each holding four gallons, and despatched to consumers all over the world.

Cheese Wax

Prior to 1939 New Zealand cheese factories were permitted to wax their cheese for export, but in more recent years this practice has been banned.

To overcome the difficulties encountered when cheese is wrapped in a cheese cloth only, a wax with a paraffin base was used for many years, more particularly for export purposes. In this connexion it should be remembered that before cheese is shipped it is held in store for many weeks, and that it also takes practically two months for a consignment of New Zealand cheese to reach the English market. Therefore, by the time the cheese reaches the English consumer there is a wastage of 4 per cent. This non-waxing of cheese results in the loss to the New Zealand dairy farmers

Specially wrapped in tinfoil, Pixie cheese has proved popular for picnics.

After filling, the cans pass to the capping and labelling machines.

After labelling, the cans are conveyed to the packing department.

of something in the vicinity of £160,000 per annum.

An important part was played by the company in this matter. For a number of years prior to the war it was known that the paraffin wax in use had many defects, the chief disadvantage being its crystalline structure; the wax covering became brittle and was easily fractured. The problem of improving the existing paraffin wax, as used before the war, was tackled, the main object being to overcome its brittle nature. Commercial trials with two cheese waxes were carried out, and the final result was one which has been given official approval by the Government Department concerned. Tests carried out by the company over a twenty-week period to find out the percentage of shrinkage under New Zealand's temperate conditions gave the following results:

	Per cent.
Cheese without wax ...	4·0
Cheese coated with paraffin wax	3·3
Cheese coated with the company's product ...	2·1

The company is in a position to start the manufacture of cheese wax as soon as the regulations have been amended.

Laboratory Work

The company possesses one of the largest and best equipped commercial laboratories in the Dominion and samples from every batch of products are tested.

In one section analytical work in connexion with the manufacture of rennet is carried out, the main function of this section being to standardise the products of the company. Rennet is tested for its ability to coagulate milk and for its acidity, which has a bearing on its keeping qualities. It then passes on for testing for salt and preservative content.

Tests are also carried out to control the keeping qualities of rennet powder under various conditions of temperature and humidity.

The work of the laboratory staff, however, is not confined to the routine supervision of the manufacture of rennet in its various forms; constant research is carried out on processed cheese to ensure the manufacture of a standard product of the highest quality.

Vats for the storage of cheese colour.

In the laboratory humidity tests are carried out.

Fats in Human Nutrition

Attempts to prove by means of feeding trials that fat should be regarded as an indispensable component of the human diet have usually failed in their object, and have demonstrated the ability of healthy adults to subsist on foodstuffs containing only minute amounts of fat. It cannot be denied, however, that on theoretical grounds fat is the most concentrated form in which energy may be supplied, while on practical grounds it is impossible to provide palatable, well-cooked, and varied meals without the incorporation of adequate amounts of fat. Fatty foods also have the advantage of undergoing digestion more slowly than those consisting mainly of carbohydrates or proteins, and so are valuable in preventing the reappearance of hunger too soon after a meal has been taken. Research on the composition of fats, and on their absorption in health and disease, was discussed at a recent meeting of the Nutrition Society, held at Birmingham, with Sir Leonard Parsons, F.R.S., as chairman.

AS a preliminary to studying the utilisation of fats in human metabolism it is essential to obtain detailed knowledge of the chemical structure and physical characteristics of the triglycerides which are their main components. This complicated subject is the speciality of Professor T. P. Hilditch, F.R.S., of Liverpool University, who has already made good progress towards formulating the main principles which determine the composition of triglycerides, and the proportions in which they occur in natural fats. Such advances have only been won by a combination of profound theoretical knowledge with both high technical skill and the patience necessary to persevere with numerous laborious chemical isolations and analyses.

Principle of "Even Distribution"

If artificial fats are made by combining glycerol with a pure fatty acid the resulting triglycerides, such as tristearin, tripalmitin, or triolein, have three linkages of the glycerol molecule taken up by the same acid. These "pure" triglycerides, however, are the exception rather than the rule in natural fats, in which the tendency is to have the three glycerol linkages combined with different acids. According to the principle of "even" or "widest" distribution a fat containing a certain acid as less than a third of its total acids will not have that acid occurring more than once in the same glyceride molecule. When the proportion of the acid rises to more than one-third of the total acids it will occur twice in some triglyceride molecules, but it will occur three times only when it makes up more than two-thirds of the total acids.

Exceptions to the rule of even distribution appear to occur in animal depot fats, such as beef and mutton fats, which are rich in stearic acid. It seems probable that these fats are laid down in the tissues according to the general rule, and that the even distribution of their acids is then disturbed by the hydrogenation of some of their oleic acid by biological processes. Uneven distribution also occurs in the milk fats of some herbivorous animals which contain substantial amounts of acids of low molecular weight.

Since most natural fats contain many more than three component fatty acids it is clear that each triglyceride molecule cannot contain all the different acids which are available. Many different glycerides are therefore formed, with the three constituent fatty acids occurring together in all possible variations consistent with the rule of even distribution. The practical difficulties involved in separating the more complicated fats into their component glycerides will therefore be readily realised.

The Composition of Fats

The analysis of the acids derived from fats by saponification is a relatively simple problem, and many data have been accumulated on the constituent acids of the various types of fat. Vegetable fats have a very wide range of composition, as would be expected between extremes so different as the almost saturated coconut and palm kernel oils and the highly unsaturated linseed and tung oils. The fats of land animals do not cover such a wide range in composition, although the differences between hard fats, such as suet, and softer fats, such as lard, are quite considerable. Marine fats differ decidedly from the land animal fats in their much higher degree of unsaturation, and in the presence of large amounts of unsaturated fatty acids with twenty to twenty-two atoms in their carbon chain. If we take the whole animal kingdom we may look upon high melting beef or mutton fat and highly unsaturated herring or cod liver oils as our extremes, which gives a range almost as wide as that found in the plant kingdom.

Native and Acquired Fatty Acids

It has long been known that animals can synthesise fats from carbohydrates, and possibly from protein. More recent work by Professor Hilditch has shown that when pigs or sheep are kept on diets low in fat the amounts of palmitic, stearic, palmitoleic, and oleic acids which are laid down in the carcass are many times greater than the quantities of these acids contributed by the food. As to other acids, however, the amounts present in the carcass could be ex-

plained by the efficient absorption of supplies available in the food. An interesting point in both the animals under investigation was the constant ratio of 1 to 2 between the amount of palmitic acid which was formed and the combined amounts of oleic and stearic acids. Palmito-dioleins are probably first synthesised from carbohydrates, and then hydrogenated to palmito-oleostearins.

Modification of Depot Fats

There is also clear evidence, however, that the depot fats of animals may be considerably modified by the inclusion of acids directly derived from the diet. Thus the consumption of vegetable oils containing characteristic acids different from those of animal fats frequently caused the appearance of significant amounts of these acids in the depot fats. In the same way the marine acids of fish liver oils may give their flavour to the eggs and body fat when they are used too freely for feeding poultry.

The composition of the fat so formed, however, does not represent a simple compromise between the dietary fat and the native fat which would be formed by the animal when subsisting on a fat-free diet. A component present in both the native and dietary fats may be included in a concentration exceeding that found in either fats. Thus when pigs or cows are given large amounts of cottonseed oil, which is rich in linoleic acid, their depot fats are modified not only by the inclusion of this acid but also by a corresponding increase in the concentration of stearic acid. The appearance in the fat of increased amounts of a doubly unsaturated, liquid acid is, in effect, counterbalanced by an increased concentration of a saturated solid acid.

The Absorption of Fats

In general a fat can be assimilated, providing it becomes almost completely fluid at the body temperature of the animal. Thus fats which melt completely at 40° C. can be digested by most animals. It is not certain, however, if the animal can utilise fatty acids which do not usually occur in its body even if they are consumed in the form of glycerides of sufficiently low melting point. Thus erucic acid is undoubtedly absorbed without apparent disturbance when it is given, in the form of rape oil, to cows or other animals, but it is doubtful whether it is compatible with their normal metabolic processes. Acids of less than twelve carbon atoms, such as those included in the butyro-glycerides of butter, are not stored in the depot fats of animals, even when they are prominent in the dietary fat.

Since the body is unable to absorb fats of high melting point it is essential that highly unsaturated oils for use in the manufacture of margarine should not be hardened by hydrogenation to melting points beyond the range 30° to 45° C. As so processed they generally contain a preponderance of unsaturated glycerides, whose acids have mainly single unsaturated linkages. This occurs because the hydrogenation process is largely selective in operation, so that no saturated acids are produced until nearly all the linoleic acid, and other polyethenoid acids, have first been reduced to monoethenoid acids.

It is important to realise, moreover, that the reduction of a linoleo group does not necessarily produce an ordinary oleo group, but that considerable amounts of elaido glycerides and lesser amounts of *cis-trans* isomers are formed. Thus a hydrogenated vegetable fat, or still more a hydrogenated whale or herring oil, will contain component acids not present in the original oils or normally found in the fat of any higher animal.

Synthetic Fats

The industrial synthesis of fats and their value for human nutrition have been studied in Germany by Dr. P. Kraut and others. Petroleum was first used as a starting material, but was later replaced by *gatsch*, a paraffin fraction obtained in the course of the Fischer-Tropsch oil synthesis. With either material carboxyl groups were introduced by catalytic oxidation with air, and after adequate purification from alcohols, aldehydes, and other contaminants the acids were combined with glycerol.

The fats so obtained, however, differed considerably from natural fats. The higher natural fatty acids, except for some doubtful rarities, always have carbon chains containing even numbers of carbon atoms. The mixtures of synthetic acids, on the other hand, had odd and even numbered carbon chains in equal proportions. In addition they always contained small quantities of dibasic acids and of *iso* acids with branched chains. In spite of their unusual composition, they were consumed in small amounts over prolonged periods both by experimental animals and humans without any obvious ill effects.

Rats, pigs, and dogs grew as rapidly with 6 per cent. of synthetic fat in their diets as they did with 6 per cent. of soya bean oil. When humans consumed 100 to 200 g. of synthetic fat daily, however, they suffered from nausea and diarrhoea. Even at lower intakes their urine contained dibasic acids, in spite of the previous removal of these contaminants from the fat by washing with water. The toxicity would therefore appear to be due to branched chain acids, which must give rise to dibasic acids during metabolism.

Synthetic fats cannot in any case rival natural fats in price, mainly on account of the laborious processes necessary for their purification. Their production, therefore, has been confined to periods of acute fat shortage caused by war. The value of relatively impure preparations for use as detergents is possibly worth further investigation.

Mechanism of Fat Absorption

Considerable advances in the knowledge of the mechanisms by which fat is absorbed from the intestines have been made during the last few years by Professor A. C. Frazer and his colleagues, Drs. J. M. French; H. G. Sammons, J. J. Elkes, and others at Birmingham University. According to their theories fat absorption takes place in three stages, during the last of which two alternative routes are available according to the degree of digestion of the fat. In the first, or "intra-luminar," stage the fat is broken down into a fine emulsion. This is effected by the complete or partial hydrolysis of some of the fat by lipase, followed by the emulsification of the rest of the fat without hydrolysis by the combined action of bile and the

products of the fat which has already been hydrolysed. It appears that triglycerides containing acids with short chains are usually hydrolysed during this stage, while triglycerides with acids having long chains tend to resist hydrolysis.

Second and Third Phases

In the second, or "cellular," phase the fat passes through the intestinal wall into the cells of the intestines, where further modifications, including phospholipoid formation, probably take place. Finally, in the third, or "distributive," phase it passes out of the intestinal cells, and is conveyed into the body by one of two routes according to its degree of hydrolysis. The short chain fatty acids, which were readily hydrolysed in stage 1, are conveyed mainly in aqueous solution by way of the portal vein into the liver. This is described by Frazer as the "non-particulate" method of absorption. On the other hand, the long chain triglycerides, which have escaped hydrolysis in stage 1, are carried in the form of small particles by way of the lymph ducts into the systemic blood stream. This mechanism is described as "particulate" absorption.

Tests of Fat Absorption

In the examination of patients believed to be suffering from defective fat absorption the first step is usually to estimate the percentage of the dietary fat which appears in the faeces. For this purpose the patient is given a diet containing a known quantity of fat and a balance sheet is kept, over a period of at least five days, between the amount of fat eaten and that excreted in the faeces. Further useful information may sometimes be obtained by increasing the amount of dietary fat or by varying its quality. Thus the administration of fats rich in short-chain fatty acids will allow the efficiency of non-particulate absorption to be tested, while particulate absorption may be tested by giving fats rich in long-chain fatty acids.

Evidence of the normality or failure of particulate fat absorption may be obtained by removing part of the intestinal contents by means of a Miller-Abbot tube. The degree of emulsification of the fat, as observed microscopically, may then be taken as a guide to the behaviour of the fat through all the later stages of absorption. Tests may also be made for the activity of lipase and other enzymes in the intestinal contents. When defective particulate absorption is associated with an increased absorption of fatty acids by the portal route the acidity and motility of the stomach are reduced, and the secretion of mucous material by the small intestines is increased. These abnormalities may readily be detected by radiological methods.

Defective Fat Absorption

According to Professor Frazer two types of defective fat absorption may be recognised. In the first type a deficiency of bile or of pancreatic secretion may cause a reduction in the efficiency of fat absorption from its normal level of 95 per cent. or more to only 10 to 20 per cent. The passage of unchanged fat through the intestines is indicated by the closely similar compositions of the dietary and faecal fats, while there is no evidence of decreased gastric acidity or motility. If the fat content of the diet is raised in cases of this type there is no corresponding increase in the amount of fat absorbed, the whole of the additional fat being excreted in the faeces.

In patients with defective fat absorption of the second type, however, the biliary and pancreatic secretions usually appear to be normal, and as much as 50 to 70 per cent. of the dietary fat may be absorbed. The faecal fat is decidedly different from the dietary fat, being particularly rich in saturated, long-chain fatty acids, which are often evident in crystalline form. Moreover if the fat content of the diet is raised the additional fat is not all rejected, but is absorbed with about the same efficiency as had applied for the fat originally present in the diet. Radiological examinations reveal abnormal mucus formation in the small intestine.

It must be concluded that in the first type of patient both particulate and non-particulate absorption are defective. In the second type a failure of particulate absorption is accompanied by normal or increased non-particulate absorption.

Secondary Disturbances

Both these types of abnormalities, however, have an injurious influence on nutrition which extends beyond the primary defect of poor fat absorption. In the lower parts of the intestines bacteria are present which subsist on materials rejected from the diet or excreted by the body. According to some workers these organisms are beneficial in synthesising certain components of the vitamin B complex, which are eventually absorbed by the body.

Professor Frazer suggests that the passage of large numbers of bacteria into the higher levels of the intestines is usually prevented by the intermittent excretion of hydrochloric acid by the walls of the stomach. This causes rapid variations in the acidity of the intestinal contents to which the bacteria are unable to adapt themselves. When the stomach ceases to excrete sufficient acid, however, the bacteria can thrive at abnormally high levels of the intestines, where the absorption of B vitamins from the partially digested food usually takes place.

In these circumstances the bacteria not only fail to contribute to the body's needs of these vitamins, but may compete with the body in using up such supplies as are available. It is not surprising, therefore, that in diseases characterised by defective fat absorption, such as coeliac disease and sprue, signs of secondary deficiencies of B vitamins are often evident. It seems inevitable, moreover, that the bacteria will similarly compete for protein and other nutrients, and so extend an original defect in fat absorption into generalised malnutrition.

Intravenous Alimentation

The nutrition of patients who are unable to digest food by means of the injection of nutrient solutions into their veins has already many useful applications in medical practice. Solutions of protein hydrolysates, usually mixed with glucose, have frequently been used for this purpose. In view of the value of fat as a concentrated source of energy attempts have been made by Dr. Elkes to prepare emulsions suitable for venous injection.

Besides being physically and

chemically stable such emulsions would need to be compatible with protein and glucose for simultaneous administration, and their injection should cause neither a general rise in the body's temperature nor local inflammation. In physico-chemical experiments it was found that in order to prepare stable emulsions it was necessary that the fat particles and the protein of the emulsifying medium should have similar electrical charges. Preparations which showed some promise of fulfilling the necessary requirements were obtained by emulsifying olive oil either with a dilute solution of blood plasma protein or with a mixture of soya bean phosphatides and dextrin. Most of the preparations, however, tended to cause the haemolysis of the red blood corpuscles, and injections have so far only been made into experimental animals.

The Manufacture of Emulsions

Professor Frazer's experiments have indicated that during particulate absorption fats become very finely subdivided before they can pass through the intestinal walls. It would seem a reasonable assumption, therefore, that in order to ensure the maximum possible absorption of any fat it should be administered as an emulsion as fine as that produced during digestion. Obviously a subject capable of efficiently absorbing the unemulsified fat may gain no advantage from this step, but if the oil is to be consumed by many subjects with varying efficiencies of fat absorption those with poor absorptive powers might benefit considerably.

Digestibility of the Product

The views expressed at the present conference suggest that with some types of food products, such as salad oils, microscopic examinations of the size of the particles should be a valuable guide as to how easily the fat component of the product will be digested. With therapeutic preparations of fat soluble vitamins, however, the problem at issue is perhaps still more important, and the value of emulsification already more clearly apparent. Thus American workers have claimed repeatedly that vitamin A is much more rapidly absorbed from stable aqueous emul-

(*Concluded at foot of next column*)

sions than it is from plain liver oils, and that this difference is most plainly evident in young children and in patients with defective fat absorption. Further research on problems of this character seems highly desirable, as there is no doubt that the results obtained would have valuable practical applications.

Classification of Filterable Viruses

SUPPLEMENT NO. 2* of the monumental Bergey's *Manual of Determinative Bacteriology*, Edition VI, 1948 (reviewed in FOOD MANUFACTURE, May, 1949), deals with the filterable viruses. They are treated in this supplement as members of an order consisting of 18 families, 32 genera, and 248 species.

In the introduction it is pointed out that there are three constituent groups that have come to be recognised, and to some extent named and classified, through the largely separate efforts of bacteriologists, animal pathologists, and plant pathologists. Taxonomic overlapping of the three groups, viruses affecting bacteria, viruses having only animal hosts, and viruses invading higher plants, can hardly be justified as yet by available evidence. Nevertheless, it has been shown that a single virus may multiply both in a plant host and in an insect vector. This seems to dispose of the thought that adaptation to a plant or animal environment would necessarily preclude utilisation of other sources of the materials needed for multiplication.

According to the author, for the present it seems feasible to continue with the custom, tacitly accepted in the past, of classifying bacteriophages separately as one sub-group, viruses causing diseases in seed plants as a second sub-group, and those causing diseases in animals as a third sub-group. It should be recognised that this may prove to be only a temporary arrangement, necessary because we have no evidence to warrant taxonomic overlapping of the three groups and useful while we await critical investigations and possible development of a substitute plan capable of displaying natural relationships to better advantage. Eventually, evidence may become available to show that some bacteriophages can infect higher plants or animals and can similarly enlarge their host ranges. Or, there may be discoveries of common physical properties that would aid in formulating an interlocking classification, for which at present we lack any substantial basis.

It is of especial significance now that the three fields be unified at least by a parallel development of nomenclature. It is towards this end that the present section of this supplement is directed.

* *The Filterable Viruses: Supplement No. 2, Bergey's Manual of Determinative Bacteriology.* Prepared by Francis O. Holmes. Pp. 160+xxiii. Baillière, Tindall. and Cox, London. Price 20s. net.

Storage of Pears

THE methods by which three varieties of pears commonly grown in Great Britain can be kept for longer periods in refrigerated gas storage than in cold storage in air are described in a recent publication.*

The varieties of pear dealt with are Conference, Doyenne du Comice, and William's Bon Chrétien. The commercial storage life of these varieties in air at 34° F. (1° C.) usually does not exceed three, two and a half, and one and a half months respectively. The corresponding values for refrigerated gas storage at the same temperature are six, four, and five months.

The maturity of the fruit when gathered and the avoidance of delay between picking and storing are of paramount importance. The publication contains a colour chart against which the ground-colour of the skin can be compared to find the correct stage at which pears should be gathered for storage, and also when they have reached the limit of their storage life.

Details of the best storage conditions are given; also discussed are the method of ripening, points on handling the fruit, and full notes on operating a refrigerated gas store.

* *The Refrigerated Gas Storage of Pears.* By Franklin Kidd, M.A., D.Sc., F.R.S., and Cyril West, O.B.E., M.A., D.Sc. Pp. 11. Food Investigation Leaflet No. 12. H.M.S.O., London. Price 9d. net.

Water Pollution Research

THE work of the Water Pollution Research Laboratory during 1948 is described in a recently published report.*

Some of the investigations which have been undertaken on purification and disposal of waste liquors have been of direct profit to industry in suggesting improvements in manufacturing processes or methods of reducing losses of valuable materials.

For many years the Ministry of Agriculture and Fisheries has operated "cleansing stations" in which mussels taken from polluted coastal waters are cleansed of bacteria before being sold to the public. The process of continuous treatment of sea water pumped from the estuary at high water includes addition of sodium hypochlorite, and aeration to remove excess chlorine and to re-oxygenate the water. This process has now been thoroughly tested and the method of operation and results obtained are described.

At some sewage-disposal works in built-up areas nuisance may be caused during warm weather by the small flies which emerge from the percolating filters used in the treatment of sewage. Investigations during previous years had shown that these flies could be controlled successfully by application to percolating filters of Gammexane or DDT, provided that the filters did not contain too great an amount of biological film. With filters treating sewage at a high rate and containing much film, the treatment was not so effective. During 1948, therefore, this problem of treating heavily loaded filters was studied in more detail, and it was found that the flies could be controlled effectively by applying Gammexane in the form of a water-dispersible powder, except when the filters were in a water-logged condition. This investigation has now been completed and it is clear that, apart from exceptional conditions, flies can be controlled by application of Gammexane without affecting the efficiency of the filters or causing the discharge of a poisonous effluent to a river.

The report also contains a description of further work on treatment of sewage by different processes of biological filtration, of experiments on the treatment in percolating filters of a sewage containing added spent gas liquor, and of work on the removal, by rapid filtration through sand or anthracite, of fine suspended matter from settled effluent from sewage works.

Investigations are described of waste waters from the washing of wheat and the steeping of barley and of the treatment of effluent from the manufacture of cider and the pickling of steel. The most detailed work, however, was on the treatment of waste waters from electro-plating, and particularly of those containing cyanides. Discharge of waste waters of this kind is often responsible for the death of fish in rivers.

* *Report of the Water Pollution Research Board of the Department of Scientific and Industrial Research for the Year 1948*. Pp. 56+iv. H.M.S.O., London. Price 1s. 3d. net.

Our Contemporaries

THE role of the modern manufacturer and trends in the design of benches, fume cupboards, apparatus cupboards, etc., are described in an article on modern laboratory furniture published in the November issue of *Manufacturing Chemist and Manufacturing Perfumer*. Another article in the same issue treats of the trends in the manufacture of soaps and detergents.

Prior to the outbreak of war the sugar industry of Java was one of the most efficient and progressive in the world. The ravages of the Japanese invader and the fighting which followed the liberation have brought double disaster to the industry. The physical and economic harm thus caused is now being slowly repaired by the industry, and attempts are being made to raise sugar production to pre-war levels within the next four or five years. An article describing Indonesia's struggles to restore her sugar industry is published in the December issue of *World Crops*.

A further interesting article deals with the effects of trace elements in plant nutrition, and the role of the more important trace elements and the effects produced by their absence in plant nutrition are discussed.

Also in this issue is Part II of the series of articles on the control of insects infesting stored foodstuffs, which deals with the use of contact insecticides.

Extracts from the Sixth Semi-Annual Report of the U.S. Atomic Energy Commission dealing with the biological and medical aspects of the uses of radio-tracers are contained in the December, 1949, issue of *Atomics*.

Correspondence

To the Editor of
FOOD MANUFACTURE

DEAR SIR,—Statements appearing in certain trade and technical journals have attributed responsibility for the organisation of the refresher course for works and plant engineers at Bristol University to the Institution of Incorporated Plant Engineers.

As chairman of the Organising Committee I must point out that this is incorrect and that no such claim has at any time been made by that Institution, which did not take any greater share in organising the refresher course than did any of the other bodies concerned.

The record entry of no less than 230 senior works and plant engineers is, on the contrary, undoubtedly due to the fact that the Organising Committee is widely representative and that it includes the Western Chairmen of the Institution of Mechanical Engineers, the Institute of Fuel, the Institution of Heating and Ventilating Engineers, the Institution of Incorporated Plant Engineers, etc., in collaboration with the Ministry of Fuel and Power and the Regional Council for Further Education.

To the whole-hearted co-operation of each one of these interests can alone be ascribed the credit for what should prove a significant contribution towards that higher productivity and efficiency which can be achieved by promoting the application of up-to-date techniques in works engineering practice.

Yours faithfully,
L. G. NORTHCROFT,
Chairman of the
Organising Committee.

Cheltenham.

News from the Industry

FORTHCOMING EVENTS

The Nutrition Society

The following meetings of the Nutrition Society have been arranged for this year:

Jan. 28. Conference on "Commonwealth Contributions to the British Diet" at the London School of Hygiene.

Apr. 15. Conference to consider "The Results of Nutritional Surveys in Ireland" at Trinity College, Dublin.

May 27. Open scientific meeting and annual general meeting at the London School of Hygiene.

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1950 Engineering Congress

The Organising Committee of the International Mechanical Engineering Congress which met in London recently has decided that this year's Congress shall be held in Brussels, the *Fédération des Entreprises de l'Industrie des Fabrications Métalliques* to act as host. The theme of the Congress is to be "Quality" and the Committee plan to define the manner in which they wish this theme to be presented. The papers and discussions of the programme of the Congress will be linked with visits to factories.

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British Food Fair

The first exhibition to be held under the authority of the Food Manufacturers' Federation, the British Food Fair, which will be held from August 29 to September 9 this year, will serve not only to advance the individual interests of exhibitors and illustrate the representative character of the Federation, but also to emphasise the place of food manufacturing as one of the principal industries of Great Britain.

The scope of the Fair will embrace all aspects of British food preparation and manufacture; it will include government, commonwealth, colonial, machinery, and packaging exhibits.

■

Health Congress, 1950

The Right. Hon. Earl de la Warr, P.C., J.P., will be President of the Health Congress to be held at Eastbourne from April 24 to 28 by the Royal Sanitary Institute.

In addition to the sectional meetings and conferences to be held during the Congress, special arrangements are being made to show films of public health interest.

Society of Instrument Technology

The programme for the next two meetings of the Society of Instrument Technology is as follows:

Jan. 31. "Continuous Gauging of Materials in Thread or Wire Form." J. C. Evans, M. Groneck, and H. G. Loe.

Feb. 28. "Some Modern Aspects of Hygrometry." Dr. H. Spencer Gregory and E. Rourke.

The above meetings will be held in the lecture theatre of the Society of Tropical Medicine and Hygiene, Manson House, Portland Place, London, W.1, at 6.30 p.m.

Royal Society Elections

At the 287th Anniversary Meeting of the Royal Society held on November 30 last, the following were elected as Officers and Council for the ensuing year:

President: Sir Robert Robinson, O.M.

Treasurer: Sir Thomas Merton.

Secretaries: Sir Edward Salisbury, Sir David Brunt.

Foreign Secretary: Professor E. D. Adrian, O.M.

Other members of Council are Brigadier R. A. Bagnold, Professor G. L. Brown, Professor H. Davenport, Professor F. G. Gregory, Sir Cyril Hinshelwood, Professor R. P. Linstead, Professor G. F. Marrian, Professor H. S. W. Massey, Professor F. E. Simon, Sir William Stanier, Sir George Thomson, Dr. H. G. Thornton, Professor C. E. Tilley, Dr. F. M. R. Walshe, Dr. V. B. Wigglesworth, and Professor S. Zuckerman.

Leonard Hill Social Club Ball

Some 150 of the company's staff and their friends entertained as their guests of honour the chairman, Mr. W. Leonard Hill, and Mrs. E. M. Hill at the first annual ball of the Leonard Hill Sports and Social Club held at the Royal Hotel, London, on December 8.

Among the prizewinners during the evening were Miss Nicholls, Miss Glassborrow, Mr. Rockell Brown, and Mr. and Mrs. W. G. Norris.

Music for dancing was supplied by Maurice Sinclair and his orchestra. One of the highlights of the evening's festivities was the cabaret in which Jane and Douglas gave impressions of the Ink Spots, Richard Tauber, and a vocal version of the currently popular zither music.

Visit to Sheffield Cannery

A party of officials and members of the National Federation of Fruit and Potato Trades recently paid a visit to the Sheffield factory of Batchelor's Peas.

During the tour of the plant the visitors saw the preparation and canning of processed peas, tomato soup, carrots, and celery. The plant canned well over 3,000 tons of plums last year, and succeeded in producing $5\frac{3}{4}$ million cans of processed peas in addition to other products during the month of July. This increased productivity is attributed to better working methods, incentive payments, and improved supervision as a result of research by a study department set up in 1947.

The visit was arranged by Lt.-Col. M. W. Batchelor, and Mr. R. R. Brown, who is Junior Deputy President of the Federation, and chairman of the Sheffield and District Fruit and Vegetables Distribution Committee.

Specimen Forms for Census

In order that traders may see the questions which they will be required to answer in connexion with the 1950 Census of Distribution, the Board of Trade are providing specimen forms. These specimen forms have already been made available to traders wishing to base their returns on a business year beginning before January 1, 1950, and can now be obtained by all traders concerned.

The specimen forms for wholesalers and merchants (including importers and exporters, manufacturers' selling outlets, agents and brokers, and warehouses) may be obtained from local Food Offices.

If there is any difficulty in obtaining them locally, application may be made to Statistics Division, Board of Trade, Thames House North, Millbank, S.W.1; in this case applicants should state the kind of business in which they are engaged. There are separate forms for multiple firms with ten or more branches and co-operative societies, and if any such organisations have not already received specimens, they should apply to the Statistics Division, Board of Trade, at the address given above.

The specimen forms should not be filled in, nor returned to the Board of Trade, but should be kept for information.

Catering Experiment

The *Wanstead*, first of three sister ships for service on the Watts Watts Line between Eastern Canadian ports and Antwerp, Rotterdam, and Hamburg, which is now on her maiden voyage, is in many respects a departure from the orthodox cargo ship. Not only has she exceptional cubic capacity and deep 'tween decks which enable large packages to be carried, but the accommodation for the crew is different from that of any other cargo ship in service.

Another innovation, which is in the nature of a sixty-day experiment, is that one deep frozen meal per day is being provided for every member of the crew. This is to ascertain whether time can be saved in the preparation of meals, and also what saving of space can be attained, together with a consequent saving of electric current and foreign currency. The meals are prepared and cooked by a London firm of caterers; they are then immediately deep frozen and sent on board packed in cardboard containers. All that is necessary is to take out sufficient of the packages, heat the contents to a proper temperature, and serve in the ordinary way. A typical meal consists of soup, braised beef, with brussels sprouts and sliced baked potatoes, and baked golden pudding.

Cooking installation in the main galley of the "Wanstead." The equipment comprises separate units installed at convenient working height.

Packaging Aids

The special displays arranged in their showroom during the winter of 1948/49 are being held again by Samuel Jones and Co. During the course of the displays anything new or interesting in relation to manufacture or publicity in each section of their organisation will be exhibited. Stationery products, coated papers and board, and sealing tape and machines have been featured, and the 1950 programme will cover gummed papers and stay papers and special coatings, adhesives, fancy papers, and self-adhesive tapes.

The latest addition to their range of adhesive papers is the Ever-ready tacky label which holds to almost any clean dry surface and is useful for trade marks, factory inspection, laboratory, masking, pricing, and many other applications. The company have also produced a new sealing machine which "shoots" out tape perfectly moistened cut ready to apply. The model issues repeating or varying lengths; it will use any width up to 4 in. and dispenses any length up to 86 in. at a single movement.

Scientific Films Census

In connexion with the Information Service of the Scientific Film Association, a national survey is being made of makers, owners, and users of scientific and similar films, in order that the Association may bring its records in the documentary, instructional, and scientific film fields up to date.

The records which are now being compiled will form an invaluable reference library of catalogues, lists, and data sheets in the first instance; later it may be possible to arrange for a wider distribution of this information by the publication of a detailed list of sources of supply of such specialist films.

The Cake and Biscuit Industries

A continuation of its efforts to obtain better supplies and freedom of production for all manufacturers is reported in the 1949 handbook of The British Cake and Biscuit Association.

An interim report entitled "A Plan for the Biscuit Industry" received the approval of the Biscuit Industry Council and the Alliance Council and was submitted to the Minister of Food in April, 1949. The report had as its ultimate objects the restoration of full home-trade competition within the industry and the relinquishment of the allocation of raw materials on the datum system, the rationing of biscuits, and the control of prices.

The Executive Committee have made recommendations to the Director of Bakeries with regard to the operative clauses in the Flour Confectionery (Control and Maximum Prices) Order relating to prices, and have also submitted views on licensing, production returns, bulk purchasing, flour, and other subjects.

The handbook gives an account of the supply and export position, and wages and conditions in the two industries, and includes a report of the twelfth annual general meeting of the Association, together with lists of officers and members.

Irish Sea Experiments

The Fisheries Branch of the Northern Ireland Ministry of Commerce are co-operating with the British Ministry of Agriculture and Fisheries in experiments to obtain information about the local migration of fish.

The research vessel *Platessa*, working from Whitehaven, has been marking fish in the Irish Sea, and the work has shown that the plaice of the Cumberland Coast form a moving population. In the early part of the year most go towards the south-east, at the rate of a few miles per week, although a few fish move more quickly, and an appreciable minority wander in other directions, one marked plaice being captured as far away as Cushendall, Northern Ireland.

A very high percentage of marked fish has been returned by fishermen of neighbouring ports—87 per cent. in twenty weeks—indicating that there is nearly an even chance of any plaice in the area being landed on a fish market within a six months' period.

A 48 in. diameter Aerofoil dual duty fan is inspected by Sir Harry Railing (*third from left*) during his visit to Woods of Colchester on the occasion of their fortieth anniversary.

40th Anniversary Celebration

Grown from a small concern in 1909 into one of the largest single works in the world specialising solely in the complete manufacture of propeller and axial flow fans, including the electric driving motors, Woods of Colchester recently celebrated their fortieth anniversary by a dinner at which the guest of honour was Sir Harry Railing, chairman of The General Electric Co.

The founder of the company was one of the pioneers of A.C. fan motors and was among those who first recognised that fans needed specialised types of motors.

Today the company produce some 70,000 fans a year. Their products include fans with contra-rotating impellers developing static pressures up to 7 in. water gauge; propeller fans up to 72 in. diameter; auxiliary mines, man cooler fans, and other types.

New Agents

Sole distribution of the Barry-wald sanitary incinerator has been taken over by Saniguard Appliances from their associates, Allied Metals.

*

The agency of the firm of essential oil distillers, Chemische Fabriek "Flebo," of Hoogezand, Holland, has been taken over by Gale and Mount. The Dutch firm specialise in the distillation of a wide range of spice oils, and a large number of the requisite raw materials are grown on their own farms.

British Fork-lift Trucks for Italy

The increasing interest abroad in fork-lift trucks is evidenced by the completion of negotiations by I.T.D., whereby Stacatrucs and Stacashovels will be manufactured under licence by Motomeccanica Soc. p. Az. of Milan, a subsidiary of one of the largest industrial engineering concerns in Italy.

The agreement provides that the value of the initial production in Italy shall be of the order of £250,000.

Starch Division Inaugurated

In view of the partial de-control of starch, Procea Products have inaugurated a Starch Sales Division with Mr. Dudley Heron sales controller.

Smithfield Show Exhibits

Two new models of food and meat preparing machinery were to be seen at the Smithfield Show held at Earls Court from December 5 to 9. A hydraulically operated power filler, with a capacity of 30 lb., constitutes an entirely new addition to the Ward-Swift range. It has single pedal foot control, and incorporates quick release nozzles and rapid opening head cover.

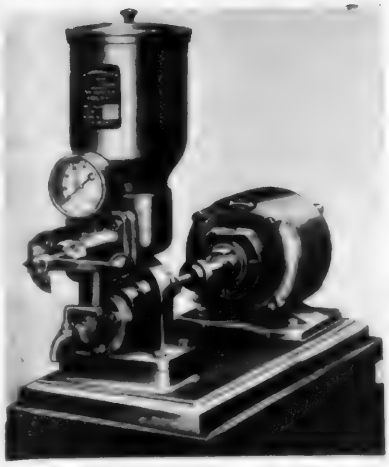
Another model shown for the first time, and designed primarily for cake and pudding mixtures, deals with whipping, mixing, and whisking all kinds of food mixtures. It has a stainless steel bowl of 20 imp. quarts capacity and embodies many features of design which make for efficiency and simplicity of control.

Other exhibits included two sizes of bowl cutters incorporating the patented whirlpool action, models of mincers, duplex-combination machines, and fillers.

Lighting fittings for use in farm buildings, and fluorescent fittings particularly suitable for modern cowsheds and dairies were among the wide range of electrical equipment exhibited by the British Thomson-Houston Company. Their selection of industrial and fractional horsepower motors for both A.C. and D.C. supplies included a 3 h.p. totally-enclosed fan-cooled motor for use in dusty atmospheres.

Industrial heating elements particularly suitable for steam boilers and sterilisers, geared-motor units and electric control gear for agricultural machinery, and magnetos for single, twin, four, and six-cylinder engines were shown, as well as a selection of Fabroil pinions.

Sir George William Rendel, the British Ambassador to Belgium (*second from right*), and Lady Rendel in conversation with Mr. J. N. Gresham (*third from left*), chairman and managing director of Gresham and Craven at the company's stand at the recent Engineering Exhibition in Brussels.



Versatile Emulsifiers

With homogenisation pressures of 400 to 500 lb. per sq. in. readily obtainable by regulation of the control valve, the Hunter Emulsors mix, emulsify, homogenise, pasteurise, and cool a liquid or mix without any intermediate handling. The whirlpool action of these machines ensures that the top surface of the liquid is drawn down into the pump, thus enabling light and heavy oils to be thoroughly mixed, and pigments or other light powders with a tendency to float on the surface to be effectively incorporated into any liquid. Thorough emulsification is obtained by means of the violent agitation in addition to the homogenising pressure to which the material is subjected, and the continued circulation enables the most difficult materials to be handled.

The machines are made in sizes ranging from the laboratory model to large production units of any desired capacity, and all models can be made to certain specifications, the stainlesss steel jacketed model arranged for pasteurising and cooling being of particular interest to ice cream manufacturers.

Health Study Tour in U.S.A.

Dr. Robert Sutherland, medical adviser and secretary of the Central Council for Health Education, recently returned from a two months' study tour in the U.S.A., under the auspices of the Rockefeller Foundation. Dr. Sutherland studied the teaching of public health in several universities and schools of public health, and health education practice in the field on the state, county, and town level, in both well-developed and sparsely populated poorer areas. He discussed policy and methods with officers of the U.S. Public Health Service, university teachers, and field workers, and studied and discussed the methods used by the many voluntary and commercial organisations interested in health education. He gave a number of lectures and participated in the Congress of the American Public Health Association.

Overhead Conveyor System

Capable of rising to any height, returning, and continuing a straight course within a horizontal distance of only 16 ft., the Flowlink overhead conveyor system enables the linking up of all phases of production into one continuous flow, and can achieve a rise of a full 90° to the horizontal, although an angle of 45° rise has been considered the maximum possible up to the present. The system can therefore be of particular value where consecutive stages of production are completed on different floor levels, and because of its horizontal-vertical power of movement, continuous flow can be achieved where fixed items of plant are in the path of a production line. This feature has been achieved by a unique method of chain and track construction in the system, all stresses being embodied within the track so that the only force exerted on the roof or other structure is the dead weight of the conveyor and its load.

Based on mass-produced units which are fully interchangeable, the system, designed by Fisher and Ludlow, will readily conform to any works layout since it is erected on site to suit the requirements of the factory. No limit is imposed on length of track because drive units can be installed at any point to compensate for load increases.

Whitehaven Mills Change Hands

As a result of friendly business relations and negotiations extending over several months, John Pattinson and Son have sold their Whitehaven Mills to Quaker Oats, with effect from December 1, 1949. Mr. John Pears, who has been prominently associated with the Whitehaven firm for thirty-six years, has been appointed manager.

The sale includes the entire block of mills and office buildings, the site and private railway sidings, and the whole of the extensive plant and machinery.

Forming one of the largest blocks of factory buildings in Cumberland, the mills were built in 1906, and occupy a site of some five acres, conveniently situated alongside the North Dock and the Queen's Dock, Whitehaven, for the intake of grain, molasses, and other raw materials in bulk. Included among the buildings are two bulk storage silos, which can accommodate over 8,500 tons of grain, and a large concrete tank for storing 700 tons of molasses.

The oatmeal plant, which is the largest in England, is capable of a very great output of oat products. It is understood that large-scale development and extensions are being planned.

The establishment of Quaker Oats in Whitehaven will provide a steady market for milling oats from England and Scotland, and the directors hope that farmers and merchants will co-operate with them by growing and supplying as many oats as possible suitable for milling.

Mr. W. H. White, managing director of Quaker Oats, is welcomed to Whitehaven by Mr. John Pattinson, managing director of John Pattinson and Son.

Conditions in the Indian Union

REVIEW OF ECONOMIC AND INDUSTRIAL SITUATION

An impressive review of the economic and industrial situation in the Indian Union was given by Mr. Rowland Owen, C.M.G., Senior Trade Commissioner in India, at the luncheon of the British Engineers' Association held in London recently.

The economic position in the Union was grim, he said, and the core of a serious problem was to be found in the food situation. An allowance of 16 oz. of food grains daily per adult head of the 337 million population of India would represent a consumption of 48 million tons of food grains per year.

This ideal was not realisable. If the figure were to be set for practical purposes at 16 oz. of food grain per adult "producer" per day, with 12 oz. for the rest, this would reduce the requirement to about 45 million tons per annum. In an average year India could produce 42 million tons of food grain per annum and this left a gap, varying with harvest results, of between two and four million tons to fill by imports, which put a heavy load on a strained economy.

The problem had been intensified because, although the Indian Union had now less mouths to feed, she had also lost a huge area of productive land.

Imports had therefore been rising steadily. In 1945/46 undivided India imported about 1 million tons of food grain. In 1946/47 the figure was 2½ million tons rising to 4 million tons (Indian Union only) in 1948/49. This could not fail to have both immediate and long term repercussions on her economic and financial structure. When it was realised that in 1948/49 she spent 32 per cent. of her total income on payments for imported food, the problem made itself apparent.

Her real trading deficit for 1948/49 was publicly announced as about £180 million, but in interpreting such figures it should be remembered that sea-borne trade returns took no account of certain important items, such as the purchase of food grains, nor of trade (with Pakistan notably) over the land frontiers. India was today failing to pay for her imports to the extent of about 40 per cent.

The effect of this on her internal economy was serious. High internal food prices were raising her cost of living and labour to a point where her products were pricing themselves out of external markets and failing to compete with imported goods.

Dealing with the labour situation, he described the present state as one of uneasy calm, but there was a slightly brighter outlook with regard to transport, and there were signs that the decline in operational efficiency experienced when British rule was withdrawn was being remedied.

Mr. Owen concluded by reminding his audience that the Board of Trade had established his organisation in India to provide information and to give assistance to British industrialists and firms in that country. He sincerely hoped that they would use the organisation fully as a centre of economic and business intelligence.

New Baking Research Member

At a meeting of members of the British Baking Industries Research Association held in Cardiff recently, Major S. C. Miles of Treherbert was elected to the Council of the Association as the representative of members carrying on business in Wales.

Members of the Research Association and of the South Wales Federation of Master Bakers' Associations afterwards heard an address by Mr. R. C. A. Bradshaw, B.Sc., Senior Scientific Officer (Chemical Research), on the work now being carried out for the baking industry.

New Cannery for Scotland

Arrangements have been made with the town council of Coupar Angus (Central Scotland) to facilitate the creation of a new cannery unit which will be housed in the old jam works now acquired by Smedleys. It is anticipated that a labour force of some 300 in the summer months and 150 in the winter will be required. Approximately 100 workers will be employed when the plant begins to work on strawberries in June.

Central Marketing at Mitcham

In order to co-ordinate the activities of Towers Creameries, Blue Arrow Products, Jack Straws, and Surrey Creameries, it has been decided to set up a central organisation which will market the products of all four companies as from January 2, 1950.

In addition to providing a smoother internal working, orders covering all available products of the four firms can now be bulked and sent in to Mitcham Food Products, Commonside East, Mitcham, Surrey, who now become the sole selling company of this manufacturing group.

Mr. L. A. Preston and Mr. F. J. Mansell, who were responsible for the bakery and grocery marketing respectively of the individual manufacturers, have been appointed to the board of the new marketing company.

This step does not in any way involve any change in the control, policy, or address of the firms concerned.

Peek Frean's afternoon tea assorted biscuits for export to the North American and other markets have been packaged in a new tin. The background colour is maroon, the doily effect is in white, and the lettering is in white and yellow.

Acquisition of Transport Firm

Together with their associate companies, PX (Carriers) have been acquired as from November 1, 1949, by the British Transport Commission, and now operate under the name of British Road Services (Road Haulage Executive), Northants Parcels Group No. 43, Cleavers Chambers, High Street, Rushden, Northants.

Farm Goes by Rail

Agricultural machinery, a "jeep," and a tractor, together with 100 head of cattle, 500 head of poultry, feedingstuffs, and poultry houses were carried by a British Railways, Western Region, 28-wagon special train, when Mr. W. F. Geach, Manor Farm, Burford, Oxford, recently travelled to his new home in Devonshire.

Mr. James Stewart

Mr. James Stewart, recently elected President of the National Bakery Students' Society, began his career in his parents' bakery shop in Glasgow. After World War I, he attended the Royal Technical College of Glasgow, where he obtained first-class certificates in both bread-making and confectionery. In 1922 he obtained employment as bakery manager with a Leeds firm and in 1924 was appointed to a teaching position under the late Mr. W. H. Quinn.

He was appointed senior bread and confectionery teacher at the National Bakery School in 1927, where, with Mr. E. B. Bennion, he developed special evening tuition and set up a City and Guild syllabus. He also collaborated with Mr. Bennion in the production of the book *Cake Making* published by Leonard Hill.

Mr. Stewart kept the School going during the last war, and did valuable work for the Ministry of Food, helping to compile surveys on yeast, and serving on a cake and confectionery technical panel. He tested dried eggs and other materials offered to the trade, and performed several emergency bread demonstrations showing how to use flour made from potatoes.

Mr. Stewart has visited the Continent twice to study foreign technical training. In 1931 he went to Germany on behalf of the National Association, and also toured France and Switzerland; in 1947 he took a party of students to Switzerland for the purpose of studying Swiss methods.

Appointments

Messrs. G. A. Boswell, H. S. Jennins, K. K. Davies, and R. Ambler have recently been appointed to the board of Brown, Bibby, and Gregory.

Mr. G. A. Boswell.

Mr. Boswell, who is now director in charge of sales, is well known in the paper and printing industry. He joined Robert Gregory and Sons as sales manager in 1936, and after his release from war service, he undertook the commercial management of Gregory's of Liverpool. In the 1948 merger he was made general sales manager of the amalgamated companies.

Mr. Jennins, chief engineer, has been responsible for many machinery innovations in the packaging field, while Mr. Davies, now director in charge of production, has travelled widely during his service with the organisation, exchanging printing and packaging knowledge with firms in Europe and the U.S.A.

Mr. Ambler joined Robert Gregory and Sons in September, 1936; he later became secretary and accountant of the amalgamated companies.

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Mr. Leonard L. Willis has recently joined the staff of The Spooner Food Machinery Engineering Co. as sales manager.

*

Mr. F. S. Wilson, F.C.W.A., A.C.C.S., who joined the Ministry of Food (Costings Division) in 1940, has resigned to take up an appointment with Crosse and Blackwell.

Prior to the introduction of the first controlled prices of preserves, canned fruit and vegetables, chocolate and sugar confectionery, and many other foodstuffs, Mr. Wilson made the first investigations into representative manufacturers' costs and distributors' margins. Thereafter Mr. Wilson was transferred to the Administrative Directorate of the Chocolate and Sugar Confectionery Division, where he was primarily concerned with production and the control of prices and margins.

More recently he has been on the Finance Directorate in the Services Department.

*

Mr. J. A. Chalmers, B.Sc., A.R.I.C., late managing director of A. Romary and Co., Tunbridge Wells, and more recently of Burton's, Blackpool, has joined the staff of Thomas Parkinson, biscuit manufacturers, Preston, as general manager.

*

Mr. A. L. Bacharach, M.A. (Cantab.), F.R.I.C., has been appointed by the Council of the Nutrition Society as a member of the Editorial Board of the *British Journal of Nutrition*. He has been Honorary Treasurer of the Society since its foundation in 1941; he is also the Society's representative on the Provisional Committee of the International Council of Nutritional Sciences, on the Parliamentary and Scientific Committee, and on the Biological Council.

Sixty Years' Service

Mr. H. Ludgate, manager of the bacon factory of Harris (Ipswich), since the building was opened in 1921, has retired. He is succeeded by Mr. G. F. H. Taylor.

At a special staff meeting held recently, Mr. Taylor read a letter from Sir John Bodinnar, managing director, expressing the firm's appreciation of Mr. Ludgate's sixty years of service, and Mr. C. McNamara, the oldest employee, presented Mr. Ludgate with a silver-plated tea service and tray.

Mr. T. Johnston, director of bacon production for the Ministry of Food, was present at the meeting.

Electrocution of Whales

Mr. Robert Marsden, of The General Electric Co., is paying a three months' visit to the *Balaena* whaling fleet in the Antarctic with Sir Vyvyan Board, chairman of The United Whalers, to continue investigations into the electrical killing of whales.

Electronic Control Safeguard

In all oil- and gas-fired furnaces there is a risk of flame failure, and unless the oil or gas fuel is instantly cut off, fuel wastage and risk of explosion are inevitable.

To cope with such an eventuality, Elcontrol have produced a safeguard which immediately cuts off the fuel supply when the flame fails, whatever the cause. The equipment consists simply of a probe projecting into the flame area, and an operating unit which can be mounted at any convenient external spot. The control actuates an electrically operated oil or gas valve.

New Food Factories

A new factory at Crawford Road, Hatfield, Herts., has been opened by W. A. Bevers for the production of potato crisps and straws.

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The British and American Salmon Curing Co. are extending their factory premises at Lammas Road, Leyton, E. London.

▪

A new fish preparation factory and cold store at Fish Docks, Grimsby, is being erected by the Dolphin Steam Fishing Co.

▪

Manley's Food Products are planning to build a new factory at Bird Street, Tynemouth.

Transfers Aid Clean Food Campaign

To assist in their Clean Food Campaign, Hammersmith Borough Council have adopted an attractive design produced in the form of Trapinex paint transfers in bright colours applied to black plastic sheets.

Traders complying with the hygienic standards which have been drawn up are supplied with a large badge to display in or on their windows; because of its durability and the fact that it can be kept clean, the transfer has proved to be the perfect medium for this purpose.

Many council arms, vehicle, and other marks have been executed for councils and government departments in the form of paint transfers, as well as safety first, salvage, and other designs. The special Union Jack designs with the slogan "From Britain" created by the Board of Trade to give a fillip to the export drive have also been reproduced in this form.

Improved Paste Mills

Of interest to manufacturers of paste type food products are the newly improved versions of paste mills now in production by Premier Colloid Mills. These have been standardised in two sizes, one suitable for laboratory work and small scale production, and the other comprising a works production unit.

Works production paste mill unit.

The new units, finished in off-white stove enamel, incorporate many advantages in their construction and use. Material can come into contact only with stainless steel surfaces; tools and feeler gauges are unnecessary for setting the working clearance, which is indicated by a setting scale on the exterior of the machines, and it is impossible for the working surfaces to come into contact and thus damage the working parts. Interchangeability of all parts is also an important development.

New Showrooms

A comprehensive range of food service equipment may be seen at the new premises of G. F. E. Bartlett and Son, at 530, Stretford Road, Manchester (telephone: Trafford Park 0288-9), recently opened as showrooms and works. A service department is available to carry out installations and repairs.

Scottish Kippers for U.S.A. ?

The belief that a substantial market for Scottish kippers can be revived and maintained in the U.S.A. has been expressed by Sir Frederick Bell, chairman of the Herring Industry Board, who recently toured the U.S.A. in a semi-official capacity.

Sir Frederick has been in touch with Scottish Office officials regarding the expansion of markets in the U.S.A., and regards the prospects for Stornoway sales as highly promising.

The necessity for the rapid organisation of quick freezing in that area, and the development of direct shipments, plus the exploitation of markets other than New York, are stressed in his report.

Quick-acting Recorder

A sensitive and high-speed instrument for recording rapidly changing magnitudes of phenomena that can be resolved as electrical resistance or voltage, the new Cambridge quick-acting recorder has a wide range of application, and charts and scales are ruled to suit the particular purpose in view.

The recorder pen is coupled to the variable arm of a measuring network, such as a resistance bridge or potentiometer, continuously maintained in balance by a servo system actuated by the unbalance voltage occasioned by the variation in the quantity being measured. The D.C. error voltage from the measuring potentiometer or bridge is chopped by means of a vibrating reed commutator. The resulting A.C. voltage is amplified and applied to a phase conscious twin rectifier system which modifies the current balance in a pair of contra-rotating magnetic clutches which in turn drive the recorder towards balance.

Damping of the pen movement is achieved either by a passive phase advance network or by means of an auxiliary slide wire system which injects a voltage proportional to pen velocity into the error circuit.

Recorder networks so far employed fall into three general types — recording potentiometers, resistance bridges, and ratiometers—but each has many variants and other general forms are possible.

Standard for Fibreboard Drums

A new British Standard for fibreboard drums for oversea shipment (B.S. 1596:1949) has been issued.

Change of Address

Greater space and more modern production equipment available in their new factory at Industrial Estate, Nitshill Road, Thornliebank (telephone: Giffnock 891), will, it is hoped, enable J. G. Jackson and Crockatt to provide much earlier delivery than has hitherto been possible. The company have in hand many orders for Canada, Brazil, New Zealand, Australia, and other countries.

Census of Production, 1950

An Order prescribing the matters about which persons may be required to furnish returns for the Census of Production to be taken this year in relation to the year 1949 has been made by the Board of Trade. The Order, which came into operation on December 31, 1949, also exempts undertakings covering the production of coal, gas, electricity, oil shale, crude or refined petroleum, or shale oil products from making Census of Production returns to the extent to which they supply such information to the Minister of Fuel and Power under Section 1 of the Statistics of Trade Act, 1947.

The title of the Order is "The Census of Production (1950) (Returns and Exempted Persons) Order, 1949" (S.I. 1949, No. 2053), copies of which can be obtained from H.M. Stationery Office.

Obituary

We regret to announce the death of Mr. William Burns Kelly, who was in his eighty-first year and had remained up to his final illness in the active service of W. J. Bush and Co. as its most distinguished and universally respected sales representative.

Mr. Kelly joined the company in 1886, when the head offices were at Artillery Lane in the City of London, and was initially associated with the internal administration of the home and country department as it was then styled. Subsequently, and still at an exceptionally early age, he took up his duties as an outside representative and continued in these activities throughout his remarkable career with the company.

Mr. Kelly leaves behind a tradition of loyalty that will continue to live in the affectionate memory of all his countless friends and associates throughout the Bush organisation and the many trades which he served so ably.

Research in the Baking Industry

RETURN TO WHITER LOAF URGED

An appeal for a steady increase in membership in order that the rate at which research work was now proceeding might be maintained and still further increased was made by the chairman, Dr. R. T. Colgate, at the annual general meeting of the British Baking Industries Research Association held on November 10.

This appeal was supported by Dr. J. B. M. Coppock, Director of Research, who said that the Association hoped to extend the practice of visiting members in order to give assistance, and receive constructive criticism. Referring to the question of a whiter loaf, Dr. Coppock urged the return to a lower extraction flour; this would mean increased feedingstuffs for the production of more eggs, bacon, and milk, and provide a greater variety in diet which, he felt, would be a stronger incentive to productivity than the monotony of the academic nutritionist's diet. He was anxious that the consumer should once again be free to select brown or white bread.

The baking industry, said Dr. Coppock, was becoming increasingly more hygiene conscious, and the British baker had nothing whatsoever to be ashamed of in comparison with American producers in this respect. He stressed the importance of "eye-appeal" in goods intended for export to America, and the need for active salesmanship and advertising in every form.

The nutritional aspect of the industry was dealt with by Dr. Norman Wright, Scientific Adviser, Ministry of Food, who was principal guest at the luncheon which followed. It was interesting to note, he said, that bakery and flour confectionery products furnished nearly three times as many calories as any other class of food and somewhere between one-third and a half of the whole calorie intake of the national diet, in addition to a high contribution in proteins and calcium. Increases in consumption of bakery and flour confectionery products had been remarkable; in spite of the large increase in the consumption of bread, cake confectionery consumption now amounted to nearly 800,000 tons per annum.

Dr. Wright then paid tribute to those who had inaugurated the Association and to its present leaders. He spoke of the success which had so far been achieved and concluded with a request to members to assist by bringing in new recruits and by referring their problems to the Association.

After lunch, guests assembled to hear Dr. Coppock give a brief technical account of his experiences during his twenty-day visit to study the baking industry in America and Canada.

Students Visit Bacon Factory

A party of nine students from the Smithfield Institute of Meat Technology recently visited the Willesden bacon factory of T. Wall and Sons.

After they had toured the abattoir and bacon factory, Mr. Collan E. B. Brett, bacon production manager, gave a short address on the bacon industry, which, he said, offered tremendous possibilities to those trained in the provision trade.

The great task before the trade, pig-breeders as well as curers, was to cater for the consumers' tastes, and these factory visits gave the firm an opportunity as curers to impress upon farmers and other sections of the bacon trade how they could help in this direction. They could tell the farmer what type of pig they wanted from him, and the distributors could keep them informed on customers' preferences.

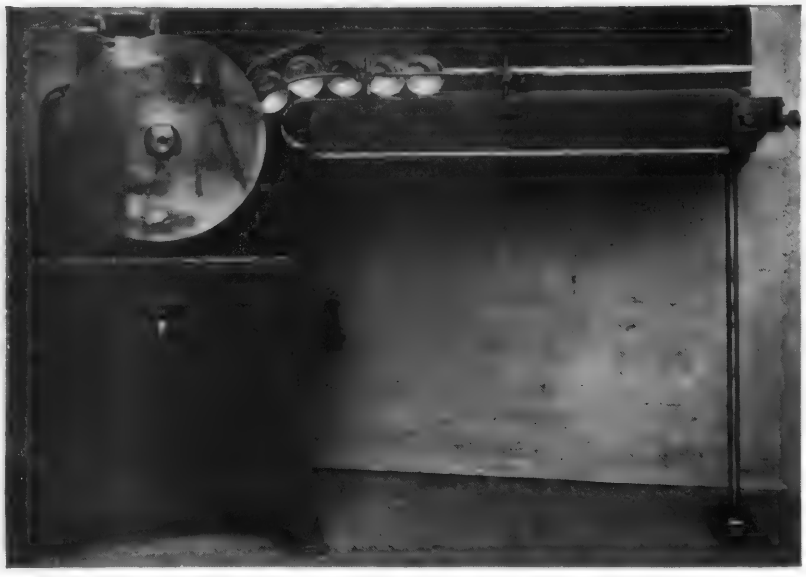
New Packs for Coffee

Coffee is to be sold in air-tight containers lined with transparent wrapping material.

Pliofilm is used as the lining material in the container now being manufactured in Great Britain.

As gas pressures are generated within the package, the ability of lining to control the pressure by allowing a certain amount of carbonic acid gas to valve through it, is important in the packing of coffee. This slight relief of the pressure being built up within the package prevents it from bursting and at the same time prevents oxygen from entering the package. Experiments have proved that freshly ground coffee can be held for ninety days wrapped in Pliofilm and still retain its freshness.

A new Order reduces the price of coffee by 4d. a lb. when not packaged in tins.



Automatic code printing machine with an output of eighty containers per minute.

Canister Code Printing

The installation of a new automatic code printing machine at a suitable position in the filling line of a food canning factory ensures that only containers printed with the current code symbols are included in the batch. Canisters from the input conveyor are accepted by the machine, which prints them on the base and ejects them on to the line conveyor, thus maintaining continuity.

The inking mechanism ensures a smooth and even ink application to the type which, coupled with the mechanical action, gives a perfectly legible code impression and, being made of rubber, eliminates the risk of fractured tinplate. The type area of $1\frac{1}{4}$ in. by $1\frac{1}{4}$ in. may contain ten individual numerals or letters, and is adequate for all normal coding requirements.

Produced by J. A. Webb and Co., the machine, which is precision built, compact, and of robust construction, will handle eighty containers per minute. The sole agents are Ufina, Ltd.

Demand for Canned Pilchards

Now averaging a daily output of 15,000 to 16,000 half-pound tins of pilchards, Cornish Canners of Newlyn use approximately 800 stone of pilchards a day at their factory, where they employ a staff of sixty-five.

According to Mr. D. A. Stephens, manager of the factory, demand still exceeds output, although the company are canning twice the amount they had planned to produce when they first started working.

Studying U.S. Packaging Methods

The Anglo-American Council on Productivity is sending a specialist team, under the leadership of Mr. George Munro Ashwell, President of the Institute of Packaging and chief packaging adviser to I.C.I., to the U.S.A. to examine the ways in which American goods are made up for retail sale and display.

In some respects and particularly in bulk packaging (with which this team is not concerned) there may be little to learn from American methods, but in retail trade American styles of packaging have gone ahead in their appeal to the customer. For example, a feature of some American packages is that they themselves have a use in connexion with the article sold, and in America it is more common than in Great Britain for packages containing foods to be transparent or to have a window transparency giving sight of the contents.

It may be that the long regime of austerity is too retentive of its hold on British practice and that restrictive economies are being perpetuated to the detriment of business. The enquiries of this specialist team will show if, in fact, British industry is lagging behind in packaging and, if so, where and why.

New E.C.G. Office

The Export Credits Guarantee Department has opened a new office at 14, Castle Street, Liverpool, 2 (telephone: Liverpool Central 5756-7). Enquiries should be addressed to the manager, Mr. E. J. Jackson.

Mass Production and Distribution

The story of food distribution in the United States from the country store to the super market of today was told by Mr. M. M. Zimmerman, pioneer of the American self-service market, during a recent visit to Great Britain.

Since the time of its inauguration in 1932, the super market and self-service industry has grown to some 14,000 units with an estimated annual volume of trade amounting to approximately 30 per cent. of America's 32 billion dollar food bill.

In addition to self-service meats, new lines of pre-cooked foods are now being developed and prepacked for consumer use, and the time is not far distant when practically all fresh vegetables will be packed in transparent wrapping material for self-service sales.

Scientific Glassware

The considerable expansion which has taken place during the last fifteen years in the manufacture of their laboratory glassware has necessitated the removal of Quickfit and Quartz from the premises of the parent company, Triplex Safety Glass, to a new factory at Stone, Staffordshire.

The manufacture of chemical plant is still mainly carried on at the parent factory, pending transfer to Stone. One of the largest recent plants made by the firm is for the manufacture of thioglycollic acid. Nitric acid and chlorination plants, continuous vacuum stills, reflux condensers, scrubbing towers, heat exchangers, and boiler units are other examples of the modern application of glass.

Three fundamental types of glassware are used to produce the most intricate plant — tubing for pipeline, blown mouldings for storage, reaction and still vessels, etc., and glass pressings. Most of the equipment used in glass fabrication is made by the firm.

All glassware is produced from blown mouldings and glass tubing. The tubing is rotated in the flames by the lampworker and the articles produced by the bending, forming, fusing, and blowing of the glass.

Most of the workers at Stone have been comparatively newly recruited; in order to get into production quickly, the fabrication of glassware was broken down into its simplest components so that within a short time an untrained person was able to perform a productive operation.

No Standards for Ice Cream Yet

The Food Standards Committee, appointed by the Minister of Food in January, 1948, to review the composition of foods and to recommend standards, have considered proposals that a statutory standard of composition should be prescribed for ice cream. The Committee have consulted the Local Authority Associations and have taken evidence from the trade associations concerned. They have also considered the rates at which necessary raw materials can be allocated to ice cream manufacturers from supplies at present available.

The Committee are of the opinion that a standard is in principle desirable for ice cream. They recommend, however, that action should be deferred, since, because of the scarcity of ingredients, especially fats and milk solids, a satisfactory standard could be prescribed at the present time only at the expense of a reduction of supplies.

Booklets Received

The first issue of a new staff magazine entitled *The Stork*, which will be distributed to the employees of Van den Berghs and Jergens and The British Creameries and The Craigmillar Creamery Co., has recently been published.

News items, photographs, and articles, including one on "80 Years of Margarine," constitute the 32 pages of this publication.

*

A wide collection of recipes, formulae, facts, figures, and observations on baking practice are contained in the fourth edition of the booklet *Commercial Bread* presented by Edme. The contents include articles on modern breadmaking, and on methods for making brown, wheatmeal, novelty, Vienna, and other bread, and buns, tea-cakes, and confectionery.

*

Consisting entirely of technical data, the *Tufnol Technical Information Catalogue* has been produced mainly to assist the design-engineer and other technicians. Included are the tests and specifications complied with by the company's sheets, tubes, and rods of various brands, and these are accompanied by illustrations to enable quick comprehension.

*

Intended both as a guide for the egg packing industry and for the information of producers and distributors, a booklet entitled *The Testing of Eggs for Quality*, which has been prepared by the Ministry of Food in collaboration with the Ministry of Agriculture and Fisheries, describes in detail the testing process known as candling, and emphasises the important part which this process can play in helping to improve the quality of eggs.

Other sections of the booklet deal with the formation, structure and composition of the eggs, and the care of eggs on the farm, including advice on production, handling, packing, and marketing. A list of standardised terms for use in describing faults in eggs is also provided.

*

With the purpose of setting out in a concise form for the assistance of designers and manufacturers of electrical equipment the characteristics and properties of the electrical resistance alloys they manufacture, Samuel Fox and Co. have produced a brochure incorporating useful and interesting data. Apart from the information dealing with the alloys, temperature conversion tables, conversion factors, fundamentals of electric heating, and data on the winding of helical coils are included.

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Presented rather as a survey of the varied services to industry offered by their organisation than as a catalogue, a recent brochure published by Timson Bros. gives an account of the sheet steel equipment, panel partitioning, material and mechanical handling, and other equipment produced by this firm.

OBITER DICTA

- The Ministry of Food has received complaints from members of the public who are unable to find canned barracouta in the shops.—*M.O.F. Press Notice.*
- If that was a banquet, give me good old fish and chips wrapped up in paper.—*Mr. L. Shinwell, speaking about the Lord Mayor of London's banquet.*
- Is the Minister aware that Camembert cheese is often at its best at the very moment when many people find it uneatable?—*Mr. E. H. Keeling, M.P.*
- I eat my peas with honey
  I've done it all my life,
  Folks think it rather funny
  But it keeps them on my knife.—*Heard during a holiday in Ireland.*
- Perhaps Mr. Churchill will see we get some real raspberry and strawberry jam again on his return to Downing Street.—*Correspondent to the "East Anglian Daily Times."*
- You haven't really lived until you have tasted ink fish. I can't describe what it tastes like.—*Señora Bolin, wife of the Director-General of the Spanish Tourist Department.*
- I shudder to think of the ceaseless cascade of medicine which is pouring down British throats at the present time. I wish I could believe that its efficacy was equal to the credulity with which it is being swallowed.—*Mr. Bevan.*
- At some future date you will be able to go down to shops at the corner and buy a packet of protein which has been made at a laboratory from atmospheric nitrogen—that is, from the air.—*Mr. A. S. B. Wilson, B.Sc., Farms Director of Edinburgh College of Agriculture.*
- At this critical time what the country needs—and that goes for its leaders too—is good red blood in its veins and good red meat in its bellies. Snoek and whale meat? What do they think Englishmen are—performing seals?—*Mr. G. E. Barrows, chairman of the Sudbury (Suffolk) Farmers' Union.*
- One talk given by a visiting minister was about onions. He said "scientists could tell whether it was going to be a severe winter by the thickness of the overcoat of an onion! In times of anxiety I have often thought of God's care in providing a warm overcoat for the onion."—*Correspondent to the "British Weekly."*

Company News

A further strengthening of the group's financial position as indicated by the increases in the revenue reserves and unappropriated profit was referred to by Lt.-Col. J. N. Horlick, O.B.E., M.C., when he presided at the annual general meeting of Horlicks held at Slough recently. Export advantages gained by their factories in England, Australia, and New Zealand were counterbalanced by the more difficult trading conditions in those export markets supplied from their American factory, and he was unwilling to make any forecast about the future of the company.

The payment of a final dividend of 16¾ per cent. actual, less income tax, for the year ended March 31, 1949, to the stockholders on the books of the company as at October 16, 1949, was approved.

World Food News

Speeding up Ice Manufacture

The saving of eighteen hours in the freezing process, the consumption of less power, and the occupation of less factory space are effected by the adoption of a new technique in ice manufacture. Developed in Haifa, the new process departs from the customary method by dispensing with the medium of brine, and the evaporating of ammonia abstracts the heat directly from the fresh water moulds. In the experimental plant the square mould is placed inside a container in which ammonia is gasified. As the ammonia evaporates, it absorbs the heat of the fresh water through the walls of the galvanised steel mould and freezes it into a square block of ice of the exceptionally low temperature of −15° C.

By the old method, an ice block of anything less than −4° C. is prone to crack on contact with the warm water used to loosen it from the mould. With the new technique warm gas is used for defrosting, the blocks slipping out with a shrinkage of only 2 per cent.

Australian Can-makers Merge

In order to give effect to the amalgamation of certain companies engaged in the can manufacturing and paper and tinplate printing fields in Victoria and other states, for the purposes of obtaining additional capital to finance the development of these industries, and to consolidate overseas sources of technical information, a new Australian company, Containers, Limited, is being incorporated.

The companies concerned in the merger are: Union Can Company, Pty., and subsidiaries, Southern Can Company (Aust.), Pty., J. T. Picken and Sons, Pty., and Dominion Can Company, Pty.

The purchase of all the shares in the can manufacturing business of James Marsh and Sons, Pty., has also been arranged, and the new company has been registered with a capital of £3,000,000.

The Metal Box Company, which has had interests in Australia for many years, has been closely concerned with this development.

Leading British and American can-making companies which have been associated in the past with the merging companies are accepting the opportunity of expanding their interests in Australia, and will provide, as in past years, a continuous supply of the latest overseas technical information, avenues for the training of personnel, assistance in the design and construction of special machinery and equipment, and the formulation of special materials.

Ireland's New Industries

Since the policy of Government assistance to industry in Ulster was inaugurated in 1932, 230 undertakings have been established. Modern developments in dealing with agricultural produce include the establishment of factories for the processing of milk and potatoes.

Seven firms are now engaged in the canning industry; it is estimated that the output of canned goods will amount to nearly 30,000 tons for the year 1949-50.

The sugar is put into sacks in an Ercsi (Hungary) sugar factory.

Advice for Irish Millers

The establishment of a research association which would cater not only for millers, but also bakers and wheat growers, was urged by Dr. D. W. Kent-Jones, Ph.D., B.Sc., F.R.I.C., in an address given to the Dublin section of the Royal Institute of Chemistry.

It had been necessary in Ireland to use a good deal of native wheat, he said, but the country was not climatically suitable for wheat growing. This resulted in the use of sprouted wheat and also, in practice, the employment of overdried and gluten-damaged wheat. This in turn often meant the production of damp and soggy soda bread loaves containing excessive dextrins and gums, or of small and unattractive yeast-raised loaves.

He suggested that an authoritative, scientific council which could advise millers and possibly bakers should be formed to give impartial advice to the Government.

Hungary's Sugar Industry

The Hungarian sugar industry has developed rapidly since 1945, following the formation of the National Union of Sugar Beet Growers. Every year national contests are organised by the Union and agricultural machinery and tools are distributed among the prizewinners to encourage more and better sugar beet production. Valuable agricultural machinery has been placed at the disposal of small growers, and tractor stations have been established.

The increased crop enables the country's twelve sugar factories to work to full capacity, the output surpassing the domestic need of 100 to 110 tons per year. However, sugar is not exported, for the production costs are still too high to make Hungarian sugar competitive on the world market. With the rising standard of living, home consumption is increasing, especially in the rural areas, where in the past sugar consumption per head of population was rather low.

A further impetus will be given to the sugar industry by the establishment of the Eastern European Sugar Beet Research Institute, which will tackle the problem of increasing the output per acre and thus lower the production costs. A type of seed has still to be evolved which will be more suitable to the climatic conditions and to the soil, making imported seed unnecessary.

International Butchers' Competition

During the Spring Industries Fair, to be held from March 21 to 29, the 11th International Butchers' Competition and Exhibition for the Meat Trade will take place in the cattle market premises at Utrecht. The exhibition will be closed from March 24 to 26.

The Association for the Advancement of Butchers' Technical Education in the Netherlands, who are organising this competition, expect that this year the number of foreign entries will be considerably higher as the meat position has become easier in many countries. The exhibition of butchers' machines, tools, and implements should attract much interest as the demand for such equipment is increasing. The First Netherlands School for the Butchery Trade will again present an extensive exhibition of products and there will also be demonstrations in meat preparation. As a special attraction an Easter Cattle Show will be organised and the best Dutch slaughter cattle will be on view.

Fertiliser Plants for Overseas

With U.S. technical assistance, The Egyptian Company for Fertilisers and Chemical Industry is constructing an up-to-date fertiliser plant in the desert area of north-east Egypt which will provide over 60 per cent. of the country's requirements. This plant, the second largest chemical fertiliser plant in the world, will have an initial output of about 300,000 tons p.a., to be increased to 500,000 tons later on. The main product will be calcium nitrate made from calcium phosphate from the Sadrat quarries, located about twenty miles from the factory. The project also includes the construction of a railway to Suez, the building of a 30,000 kW. power plant, the laying of water pipes, and the building of a town for 2,200 workers and their families.

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Firms in both the U.K. and the U.S.A. have recently been requested by the Government of Pakistan to submit plans for the construction of an ammonium sulphate plant with an annual capacity of 100,000 tons. The plant would utilise the large deposits of gypsum occurring in the Western Punjab. A Belgian firm is understood to have been engaged to report on the possibility of establishing a fertiliser industry in the country.

Canning Assembly at Brussels

INTERNATIONAL COMMITTEE CONSIDERS STANDARDISATION

British representatives at the recent meeting in Brussels of the *Comité International Permanent de la Conserve* outnumbered those of any other country, and for the first time canners of the United Kingdom were officially represented. The Committee has met regularly twice a year since 1946, after being in suspension during the war. The British Fruit and Vegetable Canners' Association was represented by Mr. J. Cadbury, and Miss M. Olliver, Mr. Dreschfeld, Dr. Banfield, Mr. Barnes, Mr. Rhodes, Dr. Tattersall, and Mr. Sycamore attended on behalf of other canning organisations and the British Food Manufacturers' Federation. The meetings were held in the offices of the Vegetable Canners' Group of Belgium, with M. Manaut, President of the C.I.P.C., in the chair.

The general secretary, M. Peissi, reported that since the last meeting they had received evidence of support from canners in England, Holland, Sweden, and a section of the N.C.A. in the United States, while tentative enquiries had been received from groups in Canada. Contact with the Food and Agriculture Organisation had been strengthened by the appointment of an observer, Dr. Van Veen, who was present for the first time.

Another branch of the United Nations Organisation with which the Committee was now acting in an advisory capacity was the International Standards Organisation on whose behalf the British Standards Institution has been entrusted with the work of establishing standard sizes of cans. At this meeting the Committee considered the case for recommending to I.S.O. the adoption of 16 oz. and ¼ club 130 sizes of cans in addition to those already suggested at the meeting of the Committee at Marrakesh in 1948. There was a lively discussion upon the coding and indelible marking of cans for international trade, particularly upon coded date-marks and the risk of their misinterpretation. Standards of quality for tomato *purée* and peas, and the nomenclature of fish packs, including sardines, sild, brisling, pilchards, and tunny, were also dealt with.

The Scientific Sub-Committee, under Dr. Cheftel's chairmanship, discussed the programme for the Second World Congress on Canned Foods, which it is hoped to hold early in 1951. In the meantime the Committee is arranging for papers to be read at the Congress upon such topics as digestibility, bacteriology, analysis, and legal definitions of canned foods.

Delegates visited the workshops of the International Machinery Corporation near Antwerp and saw a complete range of canning machinery from viners to labellers, including the prototype of a new machine for heading and gutting small fish. The delegates also visited the newly-built laboratories of the *Institut National pour l'Amélioration des Conserves de Légumes* which will soon begin work under Professor Lecrenier; the laboratories are well arranged and already possess some good equipment.

The next meeting of the Committee is planned for April 1950 in England, and the necessary arrangements are being made jointly by the Fruit and Vegetable Canners' Association, the British Food Manufacturers' Federation, The Metal Box Co., and the International Tin Research and Development Council.

Lyons International Fair

An innovation at the Lyons Fair 1950 will be a buyers' badge and a Buyers' Club for overseas visitors. The Club will be open throughout the Fair from April 15 to 24.

There are over 5,000 exhibitors, and many well-known British manufacturers are exhibiting through their French agents.

Who's Who in Ireland's Industries

The food and drink industries are represented in the ninth edition of *O'Neill's Commercial Who's Who and Industrial Directory of Ireland* for 1949/50, published by the Parkside Press.

The Directory contains a list of the firms engaged in production, and full details of all relevant trade associations, whether of firms or distributors, are included, together with membership of the various joint industrial councils.

In addition to specific sectional interests of different industries, the Directory contains a general business section giving details relating to the stock exchange in Ireland; industrial organisations; government commissions; statutory boards; and diplomatic and consular information.

News from the Ministries

Imported Apples

The Imported Apples Order, 1948, has been further amended as from November 18, 1949, so as to prescribe new tables of maximum prices at all stages of distribution. The new prices are in line with those in operation during the corresponding periods (apart from calendar adjustments) of the 1948/49 season. The maximum price areas are unchanged.

Sugar Allocations Reduced

The decision to make some reductions in allocations of sugar for certain manufacturing purposes will affect the baking industries as follows:

	Amount of Reduction tons per annum.
Flour confectionery and bakers' prepared materials	1,500
Biscuits	4,000

The general rates of allocation for flour confectionery and bakers' prepared materials will not be affected because the adjustment will be made in the special permits which in the last two years have been issued in November. In the case of biscuits the reduction amounts to approximately 8 per cent. of the total quantity at present being distributed.

Threshed Home-grown Peas

The undertaking given by the Ministry of Food since 1942 to purchase at a specified price all threshed home-grown peas which are in dry and good merchantable condition and for which the grower or contractor cannot find a buyer, will not be continued to cover the 1950 crop. The Ministry of Food will not, therefore, undertake to buy any threshed home-grown peas after the expiry of the existing guarantee on June 30 next. From that date price control will be removed from threshed home-grown peas sold for human consumption and the prices to be paid for the 1950 crop will be for negotiation between the parties concerned.

It may be assumed that some control over the import of dried green peas will be maintained in the twelve months beginning July 1, 1950, under whatever method of procurement of overseas supplies is then in operation.

Export of Seed Potatoes

After consultation with the Agricultural Departments and the Board of Trade, the Minister of Food announces that as it is felt that a reasonable time has now been allowed for booking orders, no further licences will be issued for the export of seed potatoes from the United Kingdom.

Bread Subsidy for N. Ireland

The rate of bread subsidy in Northern Ireland is to be increased from 8s. to 8s. 7d. per sack from May 15, 1949, to August 27, 1949, and to 8s. 11d. per sack from August 28, 1949, to September 24, 1949.

As already announced, from September 25, 1949, there will be a reduction of 6s. per sack and the rate of subsidy will then be 2s. 11d. per sack.

Alteration in Millers' Grists

Grists for bread making in England and Wales were altered on December 12, 1949, to:

55 per cent. Manitoban wheat (maximum).
25 per cent. home-grown wheat (minimum).
10 per cent. Australian wheat (maximum).
10 per cent. filler wheats, as available.

There is no restriction on the use of Australian or home-grown wheat in grists for purposes other than bread making.

No alterations have been made in the grists for Scotland and Northern Ireland.

Cereal Breakfast Foods

The Cereal Breakfast Foods (Revocation) Order, 1949, which revokes the Cereal Breakfast Foods (Control and Maximum Prices) Order, 1947, and the subsequent amending Orders, has been made.

The effects of the revoking Order, which came into force on November 6, 1949, are:

(*a*) to free cereal breakfast foods from price control;

(*b*) to free the manufacture and packeting of cereal breakfast foods from licensing control;

(*c*) to relieve wholesalers and retailers of the responsibility of keeping records of their transactions in cereal breakfast foods.

Meat Manufacturing Allowances

The following revised rates of allocation of meat for manufacture operate as from December 4:

Group I
(large manufacturers)—50 per cent. of datum value.

Group II
(general butchers)—6 per cent. of the value of each butcher's registrations.

Group III
(small manufacturers and cooked meat shops)—40 per cent. of datum value.

Group IV
(pork butchers)—60 per cent. of datum value.

Movement of Potatoes

The Ware Potatoes (1949 Crop) (No. 2) Order has been amended to add Sussex and Hampshire to the list of counties to which potatoes may not be sent, either by rail or road, from the following eastern counties: Bedfordshire, Cambridgeshire (including the Isle of Ely), Huntingdonshire, Lincolnshire, Norfolk, the Soke of Peterborough, and Suffolk.

Wholesale potato merchants needing supplies to supplement purchases from local growers should place orders with the Area Potato Supervisors at 28a, Jewry Street, Winchester, for Hampshire, the Isle of Wight, and West Sussex, and at 17/18, Granada House, Maidstone, for East Sussex.

Imports of Sugar Confectionery

Australia has been added to the list of countries from which limited quantities of sugar confectionery may be imported under specific licence during 1950.

Importers should submit samples of the Australian sugar confectionery, together with the manufacturer's name and address, to the Ministry of Food, Chocolate and Sugar Confectionery Division, London Road, Stanmore, for classification.

Applications for import licences on Board of Trade Form ILD/A should be submitted in duplicate to the Import Licensing Department, Board of Trade, Romney House, Tufton Street, S.W.1, but for administrative convenience they should be sent through the Ministry of Food, Chocolate and Sugar Confectionery Division, London Road, Stanmore, Middlesex.

Bread Boards

The Bread Boards (Restriction on Use) Order, 1948, has been revoked, with effect from November 5, 1949, so as to remove the restrictions on the use of the containers known in the bakery trade as bread boards, bread trays, cake trays, and flour confectionery trays. These restrictions were imposed during the war to save timber.

Imports of Fancy Cheeses

In accordance with the policy of import relaxations from November 7, 1949, the Board of Trade have granted an Open General Licence for the import of Brie, Camembert, Carré de L'Est, Demi-Sel, Pont L'Eveque consigned from and originating in any country or territory *other than* Albania, Argentina, Belgium, Belgian Congo, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Germany (Western), Guatemala, Haiti, Honduras, Hungary, Iran, Japan, Liberia, Luxembourg, Mexico, Nicaragua, Panama, Philippines, Poland, Rumania, Switzerland, Tangier, Uruguay, United States of America, Union of Soviet Socialist Republics, Venezuela, and Yugoslavia.

Australian Meat Prices

Agreement has been reached with the Australian Government regarding prices for beef and pork.

Beef and Veal.—An increase of one penny sterling per lb. on the prices operating for the 1948-1949 meat year. The new prices for beef and veal will apply for two meat years under the contract, namely 1949-1950 and 1950-1951.

Pork.—Increases in the prices of each classification of frozen pork which, after allowing for reasonable costs of treatment at works, should reflect a return to the producer of 1s. 3d. per lb. (Australian currency) as compared with 1s. 0½d. per lb. (Australian currency) operating for the 1948-1949 meat year, *i.e.* an increase of 2d. sterling per lb.

The new prices became operative from October 3, 1949.

Under the terms of the existing contract, mutton and lamb prices were adjusted upwards from July 1 last so that existing schedules in respect of these two classes of meat will continue in operation until the next review period, *i.e.* July 1950.

New Trade Arrangements in Force

THE STERLING AREA AND JAPAN

Sterling area representatives and representatives of the Supreme Commander for the Allied Powers (SCAP) have announced the completion of talks leading to a new arrangement between certain sterling area countries and occupied Japan. The sterling area countries at present included in the new arrangement are the United Kingdom and the Colonies (excluding Hong Kong), Australia, India, New Zealand, and South Africa. The approval of each of these Governments and of SCAP will be necessary before the arrangement comes into effect.

In general the new arrangement adheres to the previous established policy calling for balanced trade between the two areas at the highest practicable level. Before June 30, 1949, there was a balance of trade in favour of occupied Japan to the extent of approximately £10,000,000. This amount, it has been agreed, will be treated by SCAP as necessary for working capital to carry on trade with the sterling area.

The trade plan which deals with commodities and which was previously expressed in United States dollars will now be written in pounds sterling.

It is estimated that new purchases by Japan during the twelve months period July 1949 to June 1950 from the sterling area countries who subscribed to the arrangement, will amount to approximately £55,000,000. The estimate of the new purchases by these countries from Japan is approximately £45·5 million.

Commodities to be purchased from sterling area countries include cereals, cotton, wool, iron ore, rubber, salt, petroleum, hides and skins, and tanning materials. The sterling area countries will purchase from Japan a wide range of manufactured goods including textiles, machinery, canned fish, lumber, metals, electrical products and chemicals, and some pottery and glassware. The present arrangement envisages that the level of sterling area purchases will be maintained, and if possible expanded, whereas Japan will purchase sterling area commodities on a scale amounting to almost 100 per cent. over the figures for 1948. The new arrangement provides for a considerable expansion of trade and increased purchases by Japan of foodstuffs and basic raw materials necessary both for the export trade and for domestic consumption.

Flour Confectionery

The Minister of Food has agreed to a suggestion made by the baking industry associations that consideration of an amended maximum price structure for flour confectionery should be postponed.

Sugar and Fat for Manufacturers

As a consequence of the Government's decision to reduce the dollar import programme for 1950, it will be necessary to make some reductions in allocations of sugar for certain manufacturing purposes as from January 1, 1950. These reductions will not necessitate a return to the rationing of preserves. Individual traders are being advised of their new allocations.

Supplies of oils and fats from non-dollar sources will be substantially greater in 1950 than in 1949, and it will be possible from the end of February to make some increase in the allocations of fat for the manufacture of cakes and flour confectionery, biscuits, and ice cream and for fish frying.

Home-grown Apples

The Home-grown Apples Order, 1949, gives effect to the decision to re-introduce price control of home-grown apples.

The provisions of this Order will be similar to those in the previous Home-grown Apples Order, except that they will not apply to sales of apples for ships' stores.

Egg Products

The Egg Products (Control and Maximum Prices) Order, 1946, has been amended to give effect to the increase of the maximum prices of egg products (other than prepacked egg products) which was announced by the Prime Minister in his statement on the Government's economy proposals in the House of Commons on October 24.

The increased wholesale and retail prices will apply to egg products used by caterers, institutions, manufacturers, and ships' stores. The wholesale and retail prices of dried egg sold in the domestic pack will be unchanged.

Manufacture and Wholesaling of Food

FURTHER RELAXATION OF CONTROLS

Following the removal in October, 1948, of licensing control from the retail sale of groceries and provisions, and the recent revocation of the Manufactured and Prepacked Foods (Control) Order, which, *inter alia*, abolished controls over a large number of miscellaneous foodstuffs, the Minister of Food has considered what further relaxations could be made in the control of the manufacture and wholesaling of food.

Where the Minister is satisfied that adequate control can now be exercised by means of allocations alone, or that supplies of the principal ingredients are sufficient to allow free entry into an industry, he proposes to do away with the need for manufacturers to hold a licence. Accordingly he has decided that, as soon as the necessary Orders and administrative arrangements can be made, no licence will be required for the manufacture or processing of dehydrated vegetables, dried fruit used in jam manufacture, fruit curd, glucose, imitation honey and imported honey, and jam, marmalade and mincemeat.

The Minister has also decided to amend the Food (Restriction on Dealings) Order, 1943, so that from the date when the amending Order comes into force, no licence will be needed to trade by wholesale in bottled vegetables; canned fish products; canned vegetables; cereal breakfast foods; cheese (other than types issued against the ration); coffee; coffee essences (including coffee and chicory essences); cornflour, arrowroot, blancmange, and custard powder; fish pastes; flour; fruit curd; imported honey; jam; macaroni, spaghetti, and vermicelli; marmalade; meat products, including imported quick frozen meat meals but excluding canned meat and canned meat products with the exception of meat pastes; milk powder; mincemeat; oatmeal and oat flakes; processed fish packed in advance ready for retail sale in containers made wholly or mainly of metal, glass, or earthenware; sago and tapioca; semolina; soups (canned or desiccated); and soya flour.

The licensing of wholesalers of the following foods which are not controlled by the Food (Restriction on Dealings) Order will also be abandoned as soon as amendments can be made to the appropriate Orders:

Dried peas, beans and lentils. (*Note:* Approved buyers and peapickers of threshed home-grown peas and importers of edible pulses will still need to be licensed).

Fresh fruit and vegetables (other than potatoes).

Glucose.

Ice Cream from N. Ireland

The Ice Cream (Transport) Order, 1945, which prohibited the export of ice cream from Northern Ireland to Great Britain, has been revoked with effect from December 4, 1949.

Import Licensing Relaxations

The Open General Licence has now been amended (*inter alia*) as follows:

(i) *Group* 1. The item "Nuts, edible, in shell, not including Brazil nuts" to read "Nuts, edible, in shell, not including Brazil nuts and peanuts."

(ii) *Group* 1. The item "Fruit Juices, the following: Citrus juices, grape juices, soft fruit juices" to read "Fruit juices, except citrus juices in containers of less than two-third gallon capacity."

(iii) *Group* 5. The item "Glycol esters" under the list of exceptions to synthetic organic chemicals to be deleted and "Glycol ether esters" to be substituted therefor.

Prices of Raisins

The Dried Fruits (Control and Maximum Prices) Order, 1948, has been further amended to give effect to the increase of the maximum prices of raisins.

Fondant from Ireland

In agreement with the Board of Trade, the Ministry of Food have made arrangements for the importation of a limited quantity of fondant from the Irish Republic under individual licence.

Applications for import licences in respect of firm offers should be made on the usual form ILD/A (in duplicate) obtainable from the Board of Trade, Import Licensing Department, Romney House, Tufton Street, S.W.1.

For administrative convenience applications when completed should be submitted to the Bakery Division of the Ministry of Food, London Road, Stanmore, Middlesex. Samples of fondant are not required for examination.

Food Canning

The Minister of Food's decision, on the recommendation of the Association's Executive Committee, to wind up the Canners' (War-time) Association at the end of 1949, has made it necessary to amend the Canning of Food and Feedingstuffs (Control) Order, 1942. Under the amending Order, which came into force on November 28, 1949, holders of canning licences are no longer required to be members of the Association. As at present, licences to can will still be needed because tinplate remains scarce.

The amending Order also removes the provision requiring canners to mark their cans with an identification code. This was necessary under war-time conditions, but the identification secured under the Labelling of Food Order is now sufficient.

Oats and Oat Products

The Oat Products (Revocation) Order, 1949, which revokes the Oat Products (Control and Maximum Prices) Order, 1947, with effect from November 6, 1949, has been made.

The revoking Order, which relates to "specified oat products" milled for human food, namely, oatmeal, brown groats, oat flakes, rolled oats, white groats, and oat flour, has the following effects:

(*a*) the removal of licensing control of the milling of specified oat products;

(*b*) the removal of licensing control of the prepacking of oat flakes and rolled oats;

(*c*) the freeing of specified oat products from price control;

(*d*) the relieving of wholesalers and retailers of the responsibility of keeping records of their transactions in specified oat products.

There is no change in the existing controls on sales and purchases of oat products and oat by-products as animal feedingstuffs.

Following the revocation of the Oat Products (Control and Maximum Prices) Order, 1947, the Minister of Food has further amended the Oats (Control and Prices) (Great Britain) Order, 1948.

The amending Order, which came into force on November 6, 1949, alters the definition of oatmeal miller and provides that only oatmeal millers who are licensed as approved buyers may buy oats from growers. All existing oatmeal millers who are at present licensed under the Oat Products Order will be re-licensed as approved buyers of oats without special application.

Information and Advice

Cold Mix Ice Cream Powder

B.3705. *Can you suggest a cold mix ice cream powder containing gum tragacanth, to which only water has to be added?* (Ireland.)

The following formula, when reconstituted with water, will make about nine gallons of mix:

	lb.
Full cream milk powder	14·25
Sugar	13·00
Margarine	6·00
Gum tragacanth	·50
Glyceryl monostearate	·50
Water	65·75
	100·00

The mix is prepared in the ordinary way and after homogenisation it is placed in the evaporator until about half the water has been removed. The process is completed in the spray drier.

It may be asked why as much as 6½ gallons of water should be added when the whole of it is to be removed in processing. The answer is that the quantity of water mentioned is required to dissolve the whole of the milk powder and thus ensure a uniform mix.

Scalding Pigs by Resin

B.3872. *We should be pleased to receive details of a new method of scalding pigs by using resin.* (Yorks.)

The pig is scalded and dehaired in the usual way and then, while still moist on the surface, it is passed through a tank of a compound of molten resin. It picks up a coating of the resin, which is easily peeled off, bringing with it any bristle that has been left by the dehairer—particularly in the coarse skin round the neck and head. It is really a finishing process and, to a very limited extent, has also the same effect as singeing. Not being so severe as singeing, it does not affect the gelatin value of the skin. If efficiently operated, the process is suitable for dressing pigs, no matter for what use they are required.

Names and addresses of American suppliers and British agents were given.

Salting Cucumbers

B.3902. *Could you let us have details of the procedure for salting cucumbers?* (Notts.)

One process that has been suggested is to treat the cucumbers for about six weeks in a 10 per cent. brine. During this time a lactic acid fermentation takes place which gives the cucumbers the requisite aroma and at the same time provides a means of preservation.

At the end of the six weeks the salt content of the brine is increased to 15 per cent., which provides better keeping qualities.

It is advisable to prick the cucumbers prior to processing as it has been found that this gives the pickled cucumbers a better consistency.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.3877. *Prepacking fruit syrups.* (Ireland.)
B.3879. *Corking machines.* (Mexico.)
B.3883. *Pneumatic conveying systems.* (London.)
B.3884. *Extruding machinery for cake decorations and vermicelli.* (Surrey.)
B.3885. *Monosodium glutamate.* (London.)
B.3887. *Transparent wrapping paper.* (Glam.)
B.3889. *Low voltage refrigerator.* (Lancs.)
B.3891. *Cheese flavouring.* (Dorset.)
B.3899. *Almonds, walnuts, Brazil nuts, hazel nuts, and desiccated coconut; also glass jars for sweets.* (Essex.)
B.3900. *Almond blanching machines.* (Surrey.)
B.3901. *Tins and cartons suitable for packing potato crisps.* (Denbigh.)
B.3908. *Importers of edible rice papers.* (Lancs.)
B.3910. *Wire strapping machines and nails for box making.* (Ireland.)
B.3911. *Potato crisp machinery.* (Devon.)
B.3912. *Bone scrapers as used in the baking trade.* (Yorks.)
B.3913. *Fish protein for confectionery.* (Holland.)
B.3914. *Five-roller chocolate refiner.* (Italy.)
B.3916. *Label dating machinery.* (Renfrew.)
B.3917. *Macaroni machinery.* (Australia.)
B.3920. *Hand-operated ice cream freezers, 2 qrt. size and upwards.* (Herts.)
B.3926. *Meters for measuring viscous fluids.* (Lanark.)
B.3927. *Pie machine.* (Lancs.)
B.3929. *Automatic tea packeting, labelling, and weighing machines.* (Durham.)
B.3932. *Fruit pulps in SO_2.* (Belgium.)
B.3933. *Tomato purée and beans.* (Ireland.)
B.3936. *Chicken canning.* (New Zealand.)
B.3937. *Pop corn machinery.* (Durham.)
B.3938. *Apple peelers, bottle fillers for chutney, jar manufacturers, and packing cases.* (Beds.)
B.3948. *Saponin and sodium lauryl sulphate.* (Essex.)
B.3949. *Effluent recovery plants, mechanical expulsion of oils or moisture from oil seeds, plant for the manufacture of meat and bone meal, and for the manufacture of fish meal.* (Isle of Man.)
B.3950. *Fondant making plant.* (Ireland.)
B.3951. *Cherry de-stoning machine.* (Kent.)
B.3954. *Multi-moulding machinery.* (Lancs.)

Information Required

B.3859. *Name and address of manufacturers of "Glick," which is believed to be a gluten increaser.* (Lancs.)
B.3919. *Suppliers of tomato ketchup and mushroom ketchup in bulk.* (Kent.)

Recent Patents

630,053. BAKER PERKINS, LTD., and POINTON, J. E.: Mixing and like machinery.
630,153. APPAREILS ET EVAPORATEURS KESTNER.: Method of and apparatus for the preparation of soluble coffee powder.
630,257. BERKEL AND PARNALL'S SLICING MACHINE MANUFACTURING CO., LTD.: Slicing machines.
630,261. CHELLE, P. L.: Automatic machine for punching and shaping sealing caps or covers and feeding them to containers.
630,270. A.S.P. CHEMICAL CO., LTD., WALSH, C. L., ADAMS, B. A., and COOK, J. P.: Process for the extraction and purification of wax obtained from the flesh of sisal.
630,545. SAFETY CAR HEATING AND LIGHTING CO., INC.: Apparatus for milling grain or the like products.
630,550. KALBERMATTEN, C. DE: Storage rooms, such as silos or cellars, particularly for vegetables, fruit, or cheese.
630,604. JAEGER, C. F.: Machines for mixing, kneading, or mincing meat.
630,622. VIVIAN, G. S.: Cartons and like containers.
630,900. NAAMLOOZE VENNOOTSCHAP CENTRALE SUIKER MAATSCHAPPIJ: Processes for the production of edible syrups.
630,931. BAKER PERKINS, LTD., and HART, J.: Means for supplying biscuit dough to dough sheeting or other dough treating machines.
631,027. TRIGGS, W. W. (BEICH CO., P. F.): Method and apparatus for making chocolate confectionery.
631,129. GREER CO., J. W.: Methods of and apparatus for conditioning chocolate.
631,241. WHITTINGSLOWE, W. T.: Base for a vegetable and fruit grater, slicer, peeler, and juice remover.

Abstract of a Recent Specification

Pneumatic Sack Cleaning Apparatus

The present usual apparatus for cleaning sacks consists of an air fan connected up by a branch to the larger end of a conical cleaning nozzle forming the air intake, the mouth of the sack to be cleaned being placed round the outer rim of the smaller end of the cleaning nozzle and being then drawn up inside out by suction from the air fan into the nozzle, so that the air stream flows through the reversed sack, carrying off from the now exterior of the sack any loose material, which is recovered by the air stream being subsequently passed through a filter.

In such apparatus the junction of the smaller diameter intake branch centrally to the larger part of the conical cleaning nozzle results in a shoulder being formed round the interior of such larger end of the nozzle, and consequently as the air stream passes up the nozzle eddy currents and turbulence are set up in the shouldered recesses at this point, and the air stream, having to converge towards the smaller central outlet to the intake branch to the fan, prevents the sack being distended by the air flow, the folds in the sack rendering the cleaning operation partially ineffective.

The object of the present invention is to provide a construction of sack cleaning apparatus whereby the sack when sucked inside out into the cleaning nozzle shall be completely distended by the air stream and thoroughly cleaned.

Sack-cleaning apparatus of the kind referred to comprises an air fan to the suction side of which a tube structure is connected, the bore of the tube gradually increasing from its inlet nozzle to a position approximately corresponding to the length of the sacks to be cleaned and then diminishing to the suction side of the air fan, the interior of the tube sequence being entirely free of peripheral shoulders, the sacks being adapted to be positioned round the inlet nozzle of the tube and sucked up into the tube inside out and distended into the enlarged part of the tube.

617,455. *Robert Greaves and Bruce Bousfield Greaves.*

Recent patents have been selected from the "Official Journal of Patents" and are published by permission of the Controller of H.M.S.O.

Trade Marks

HUNT'S.—663,158. Apricots, peaches, pears, beans, spinach, and asparagus, all being canned goods. **Hunt Foods, Inc.** (a Corporation organised under the laws of the State of Delaware, United States of America), 3055, Wilshire Boulevard, Los Angeles, State of California, United States of America; Packers and Merchants.

OPTIMUS.—665,363. Coffee, coffee extracts, coffee and chicory mixtures, and coffee and chicory extracts. **Clark's Optimus Coffee Extract, Limited,** 3, Shaw Street, Worcester; Manufacturers.

SUGATHIN.—671,358. Mixtures of sugar and lecithin for use as food or as ingredients in food. **The W. J. Fitzpatrick Company, Inc.** (a Corporation organised under the laws of the State of Illinois, United States of America), 111, North Canal Street, City of Chicago, State of Illinois, United States of America; Manufacturers.

ESTEL.—672,908. Meat offal, poultry, game and fish, all being canned or potted foodstuffs; and frozen fish, canned fruits, frozen fruits, canned vegetables, frozen vegetables, jams, fruit preserves, vegetable preserves, and canned soups. **Sheed Thomson and Co., Limited,** Hibernia Chambers, London Bridge, London, S.E.1; Provision Importers and Merchants.

PENGUIN.—673,996. Ice cream and ice cream powder. **Lorenz Haden (Ices), Limited,** Burton Road Dairy, Burton Road, Dudley, Worcs.; Manufacturers and Merchants.

SPOT.—674,044. Sauces. **Alan Wright,** trading as **A. Wright and Son,** 86B, Station Road, Sidcup, Kent; Manufacturer and Merchant.

HANNO.—674,116. Tinned mushrooms. **Dansk Champignon Industri Aktieselskab** (a Company incorporated under the laws of Denmark), Hovedgade 31, Soborg, Denmark; Manufacturers.

EDIFAS.—674,873. Vegetable derivatives for use as ingredients in food as binding, stabilising, and emulsifying agents. **Imperial Chemical Industries, Limited,** Wexham Road, Slough, Buckinghamshire; Manufacturers and Merchants.

MAYFAT.—675,401. Edible oils and edible fats. **Maypole Dairy Company, Limited,** 179-180, City Road, London, E.C.1; Provision Merchants.

EKEM.—675,570. Bottle filling machines, bottle sealing machines, bottle stoppering machines, bottle washing machines, and bottle capsuling machines. **Busby, Winter and Company, Limited,** 22, Broad Street Avenue, London, E.C.2; Manufacturers.

SUNBREAK.—675,576. Breakfast foods made principally of rye flour. **Solflower, Limited,** The Trading Estate, Rogerstone, nr. Newport, Monmouthshire; Manufacturers.

SYLFARE.—675,580. Fruit juices, and vegetable juices for use as beverages or as ingredients in beverages. **Solflower, Limited,** The Trading Estate, Rogerstone, nr. Newport, Monmouthshire, Manufacturers.

Trade marks have been selected from the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

Anutrol, Limited. (474662.) 39-41, New Broad Street, E.C.2. To carry on business of manufacturers of and dealers in food of all kinds, etc. Nom. cap.: £2,000 in £1 shares (1,900 cum. pref.). Dirs.: To be appointed by the subs. Subs.: E. Rosenthal, 21, Eton Hall, Eton College Road, N.W.3; A. White, 97, Blythswood Road, Goodmayes, Essex (coy. secy.).

Crunch Crisp Company, Limited. (474674.) Buck Street, Colne. To carry on business of manufacturers of and dealers in potato crisps, salted peanuts, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: F. Bannister, 5, Hardy Avenue, Brierfield; A. H. Crowther, Sherwood, Reedley, nr. Burnley.

Vectis Frozen Foods Limited. (474708.) Mitchell Avenue, Ventnor, I.W. Nom. cap.: £300 in 1s. shares. Dirs.: F. J. Slattery, Newport House, Ocean View Road, Ventnor, I.W.; A. J. Whatson, 1, Oldbury Terrace, Southgrove Road, Ventnor, I.W.

Midland Biscuit Company, Limited. (474725.) 158, Arbury Road, Stockingford, Nuneaton. Nom. cap.: £1,500 in £1 shares. Dirs.: W. M. B. Hall, 320, Baldwins Lane, Hall Green, Birmingham, 28; G. Bainbridge, 73, Rugby Road, Hinkley, Leics.; A. Hazlewood, 56, Ansley Road, Nuneaton.

Sydney Walton, Limited. (474732.) 102, High Street, Manchester, 4. To carry on business of importers, exporters, and wholesale commission salesmen of and dealers in fruit and vegetables, etc. Nom. cap.: £10,000 in £1 shares. Dirs.: S. Walton and Lilian E. Walton, 1, The Meade, Wilmslow, Cheshire.

W. Phipps and Sons (Curers), Limited. (474783.) Cold Stores, Aire Street, Castleford, Yorkshire. To carry on business of fish curers, etc. Nom. cap.: £3,000 in £1 shares. Permt. dirs.: W. J. Phipps, 2045, Hessle High Road, Hull; J. W. Phipps, 339, North Road, Hull; F. Phipps, Hill Top, Red Hill Road, Castleford.

Ernest Kay, Limited. (474824.) Sheaf Market, Sheaf Street, Sheffield. To carry on business of wholesale and retail dealers in fruit, flowers, vegetables, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: E. Kay and Mrs. P. Kay, 252, Abbey Lane, Sheffield.

S. and D. (Crisps) Company, Limited. (475107.) 90, Jermyn Street, S.W.1. Nom. cap.: £3,000 in £1 shares. Dirs.: T. J. Dilks, 61, Ealing Road, Wembley; J. Starr, 31, Cranley Gardens, S.W.7.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

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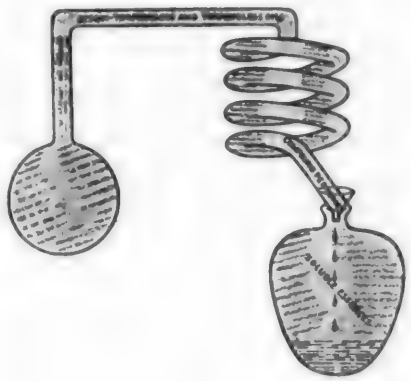

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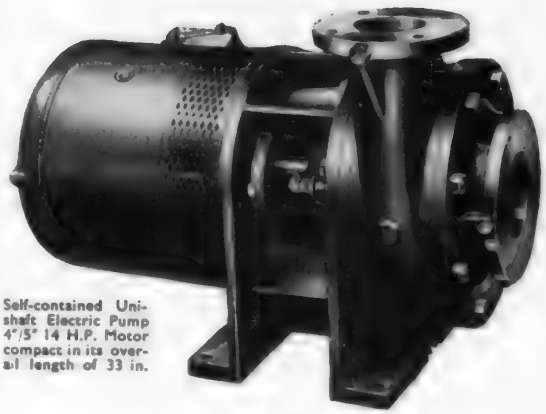

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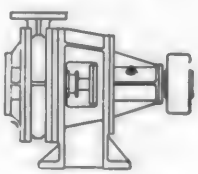

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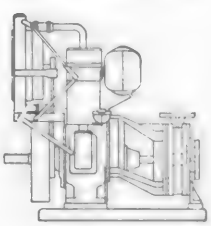

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Miss M. A. Armstrong, Exhibitions Representative, Canada House, Trafalgar Square, London, S.W.1. Tel. Whitehall 8701

or your nearest Canadian Trade Representative

LIVERPOOL: M. J. Vechsler, Canadian Government Trade Commissioner, Martins Bank Building, Water St.

GLASGOW: J. L. Mutter, Canadian Government Trade Commissioner, 200 St. Vincent Street.

BELFAST: H. L. E. Priestman, Canadian Government Trade Commissioner, 36 Victoria Square.

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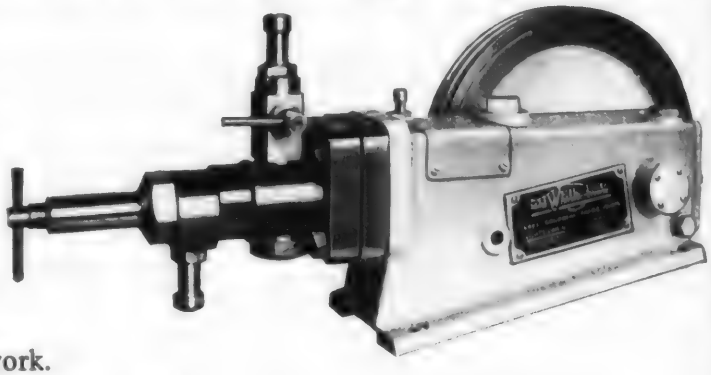

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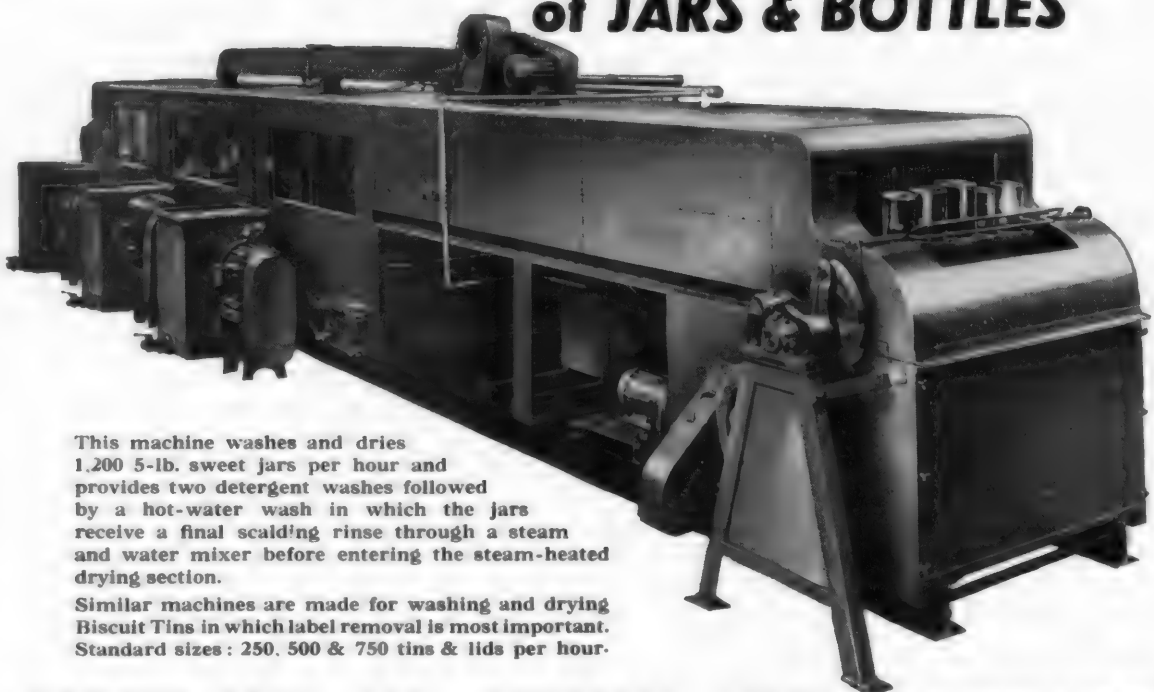

This machine washes and dries 1,200 5-lb. sweet jars per hour and provides two detergent washes followed by a hot-water wash in which the jars receive a final scalding rinse through a steam and water mixer before entering the steam-heated drying section.

Similar machines are made for washing and drying Biscuit Tins in which label removal is most important. Standard sizes: 250, 500 & 750 tins & lids per hour.

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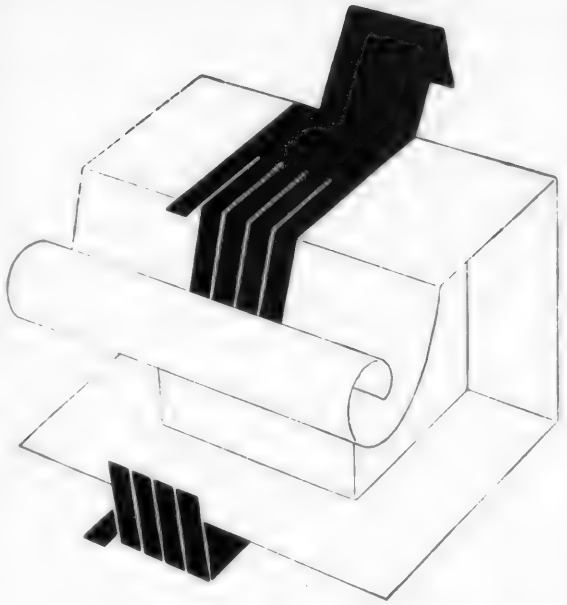

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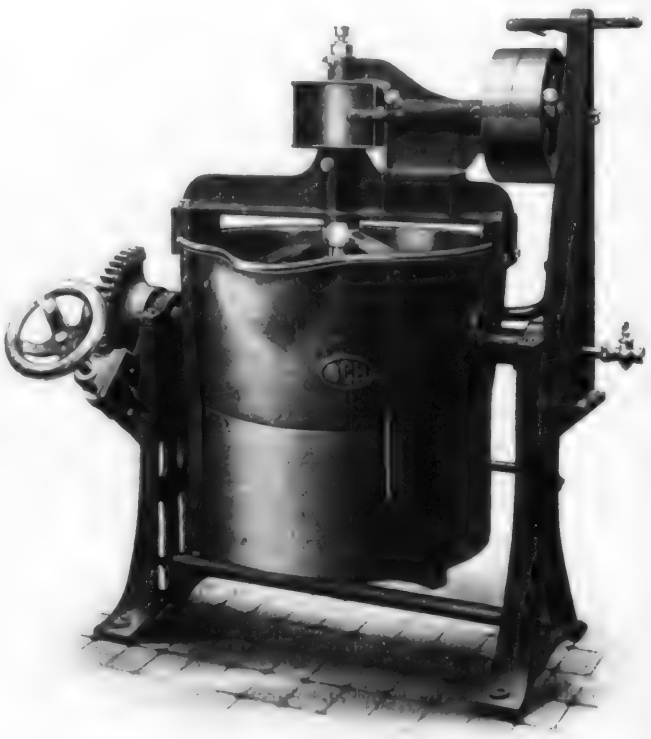

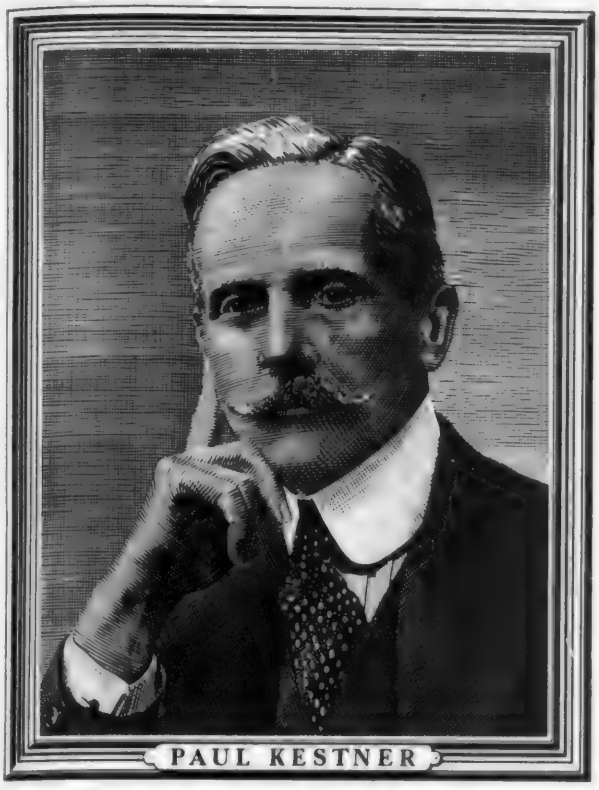

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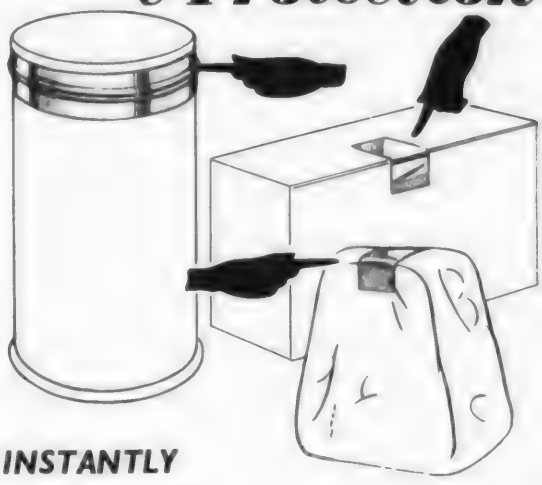

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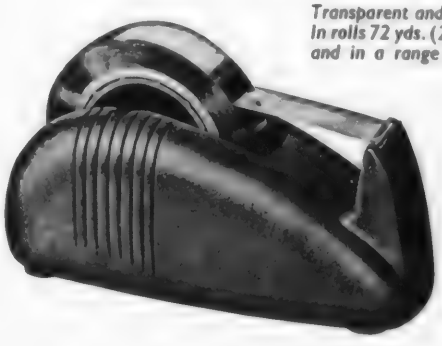

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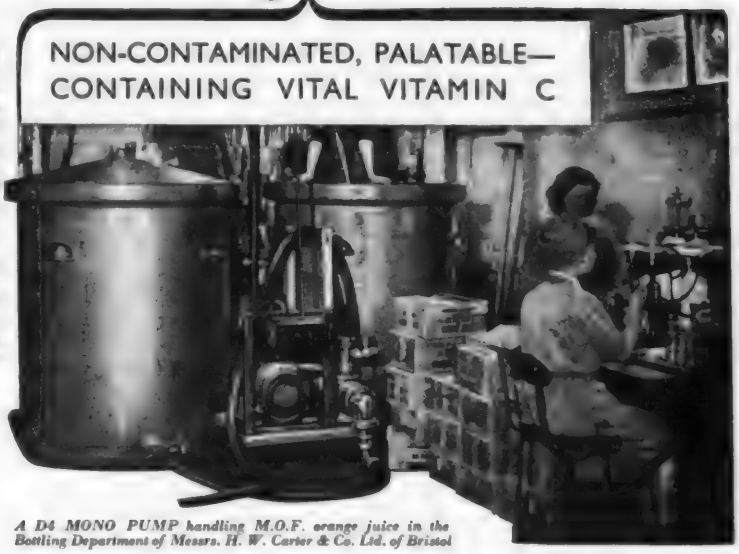

A D4 MONO PUMP handling M.O.F. orange juice in the Bottling Department of Messrs. H. W. Carter & Co. Ltd. of Bristol

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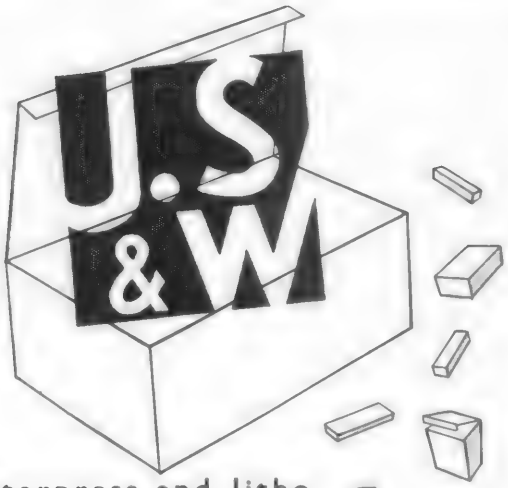

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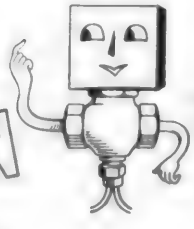
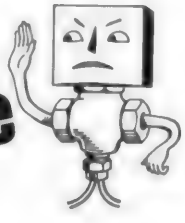
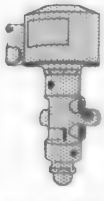


it's an OPEN and SHUT case



. . . FOR MAGNETIC VALVES



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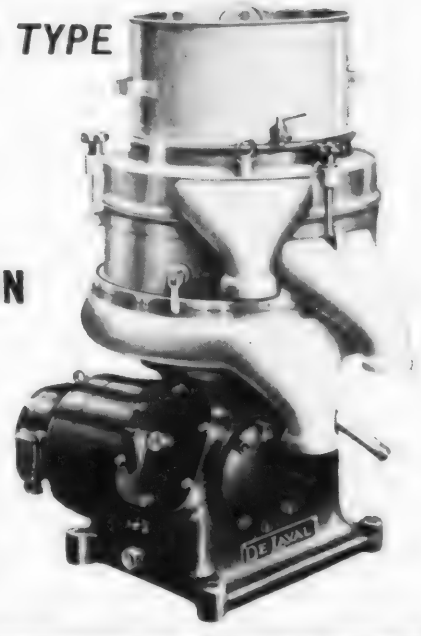
for the
CONTINUOUS
CONCENTRATION-CLASSIFICATION & WASHING OF SOLIDS



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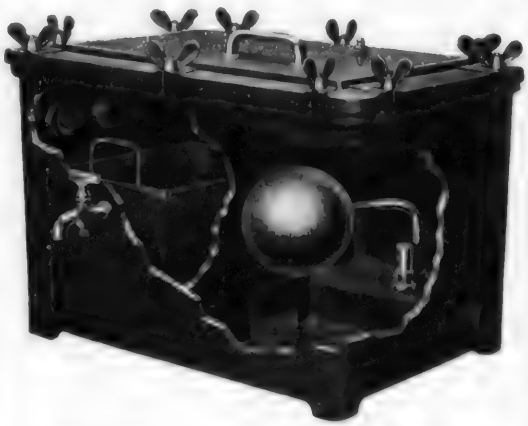

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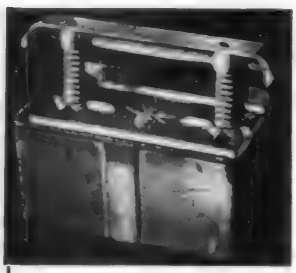

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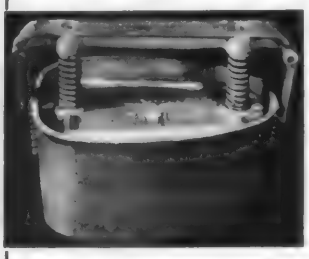

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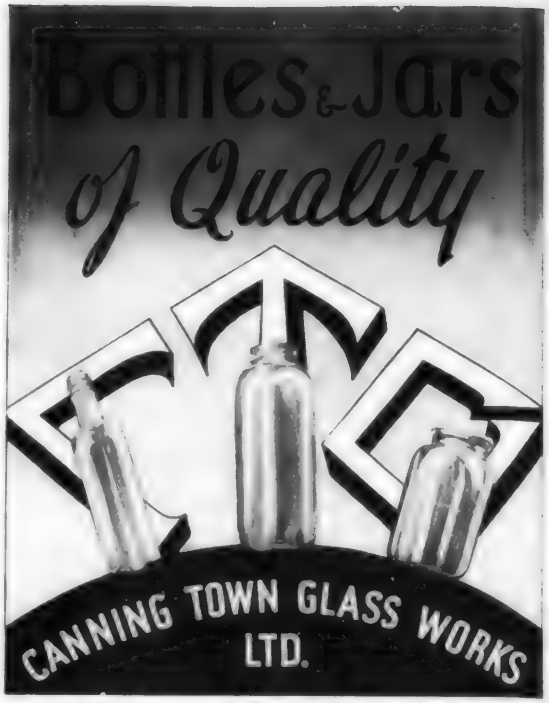

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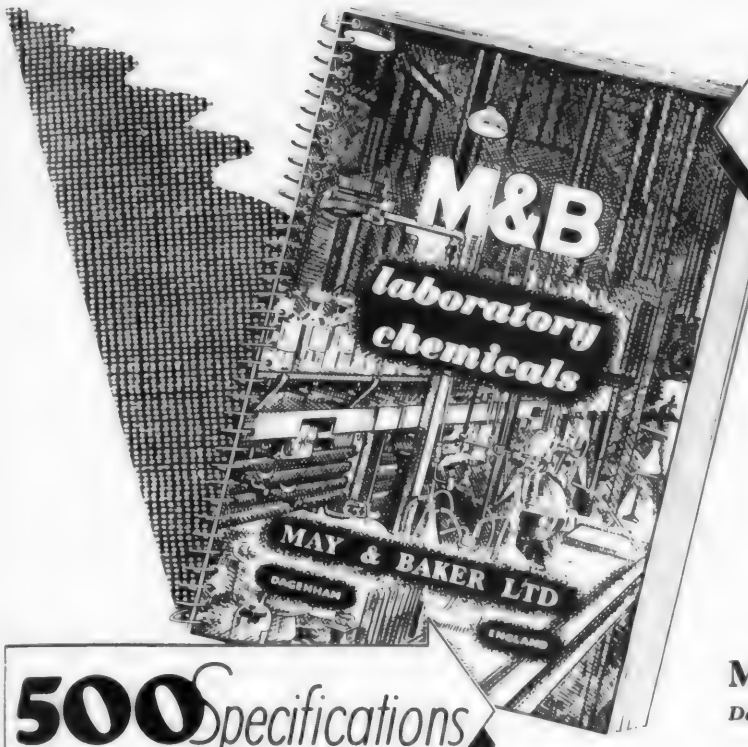

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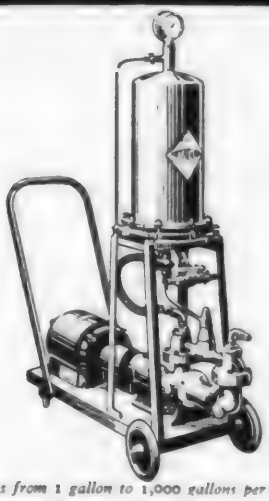

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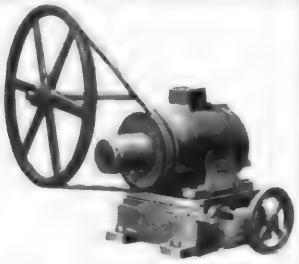

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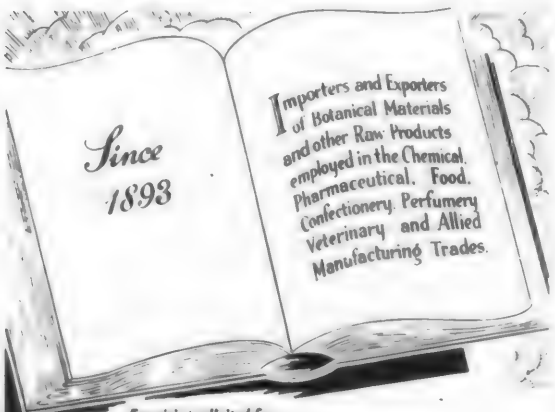
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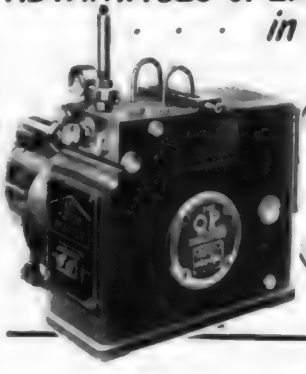

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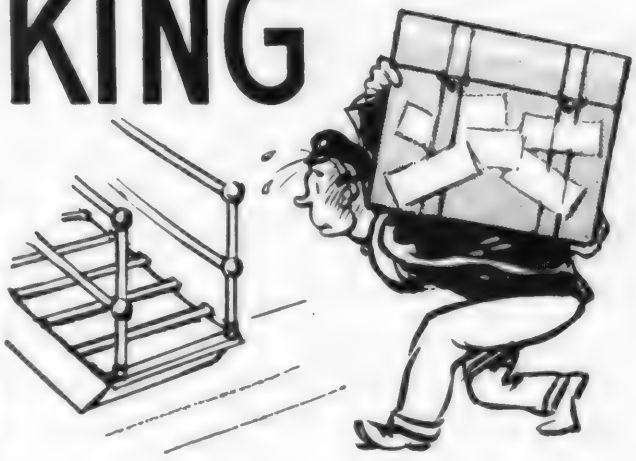

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Maximum diameter handled	7½ in.	13 in.
Maximum height handled	12 in.	18 in.

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Electrical machinery is the most important factor in food manufacture, ensuring cleanliness and hygiene.

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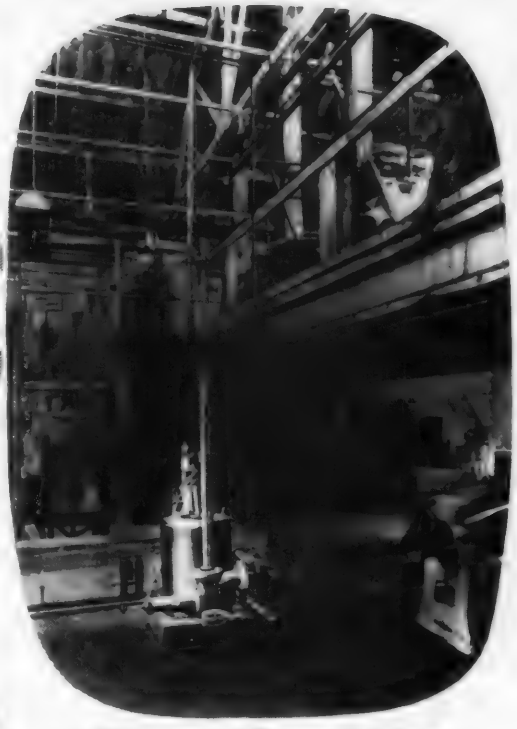
Ejectopump

pumping APPLE PUREE, TOMATO SAUCE, DICED VEGETABLES and other products



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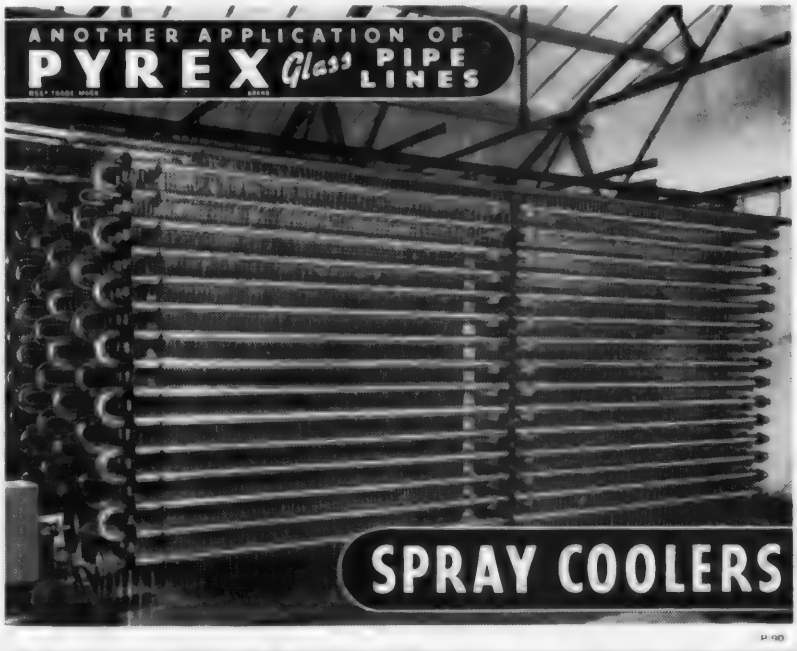

P.90

Extracting 600,000 B.T.U.s per hour, Mean Temperature difference 6·5° F.

THE spray cooling installation here shown is made up from PYREX Brand standard Glass Pipes and return bends, and is extracting 600,000 B.T.U.s per hour with only 6·5° F. mean temperature difference, from weak Hydrochloric Acid.

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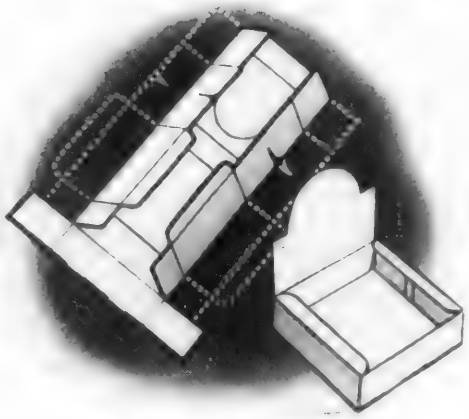

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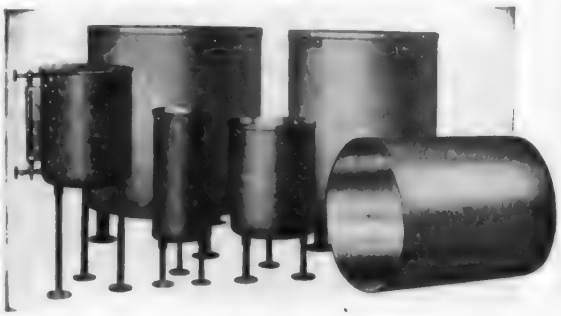

IN STAINLESS STEEL

The containers illustrated are typical of the non-corrosive, hygienic and easily cleaned equipment made by us for the Food Industry.

Fitments of all kinds, containers, utensils, etc., made to requirements in light or heavy gauge "STAYBRITE" STAINLESS STEEL, MONEL METAL, COPPER OR STEEL

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Recommended for use in place of Cocoa Butter, etc., etc.

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Moisture Magnet. Made of best quality crepe paper, Hi-Dri towels absorb every drop of moisture. Will not disintegrate when wet because of the high degree of "wet" strength.

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Write or phone today for details or ask for a demonstration of Hi-Dri paper towels and further proof that they can help you cut absenteeism.

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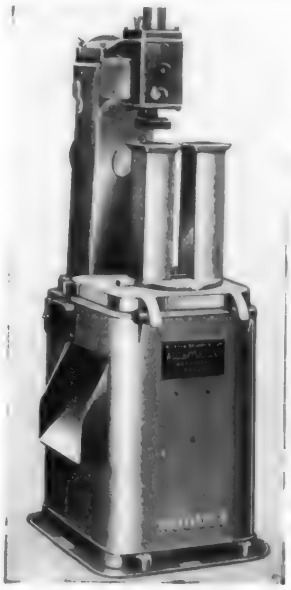

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The ROBUST high-speed meat and food dicing machine has an average hourly output of 9 cwt. Equipped with a 2 h.p. motor, it measures 27 in. by 20 in. by 8 ft. 4 in. high, with feed boxes 3½ by 3½ by 18 in. Cuts meat, including whale, vegetable and fruit into regular cubes, slices and strips. Supplied with easily interchangeable knife frames. Weight approx. 7 cwt.

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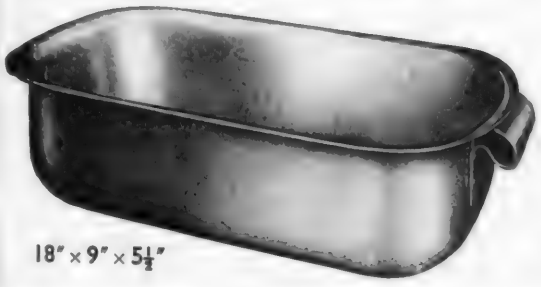

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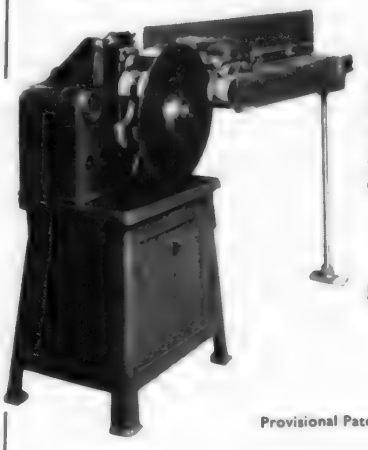

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Will handle 5,000 containers per hour.

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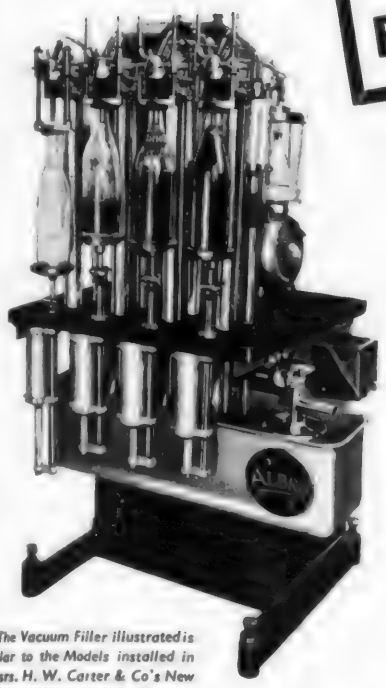

★ *The Vacuum Filler illustrated is similar to the Models installed in Messrs. H. W. Carter & Co's New Fruit Juice Factory recently opened at Coleford.*

A 4-HEAD FILLER for ALL Liquids & Squashes

Here's a worthy model in the fine range of ALBRO Vacuum Fillers for every purpose!... It's the all-British ALBRO 4-Head Semi-Automatic Vacuum Filler—designed to step-up food production output with these remarkable features :

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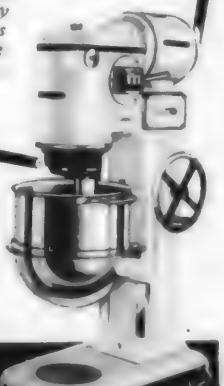

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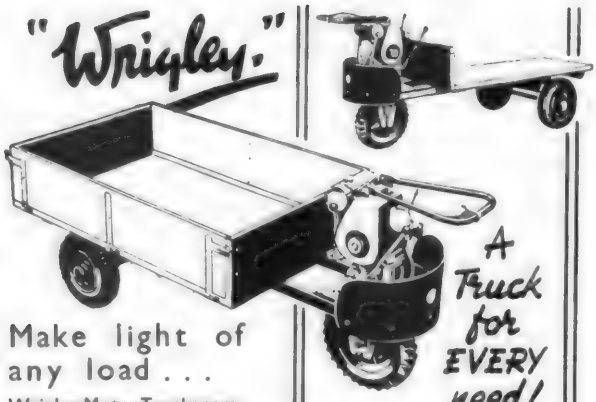

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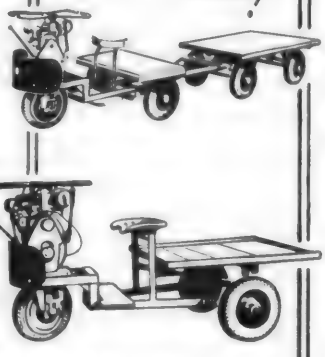

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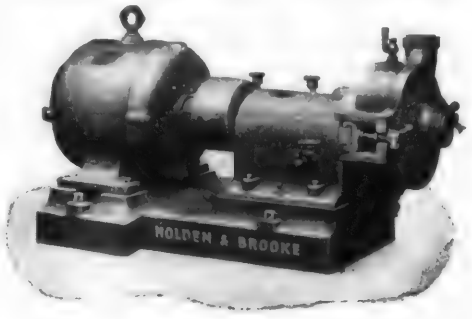

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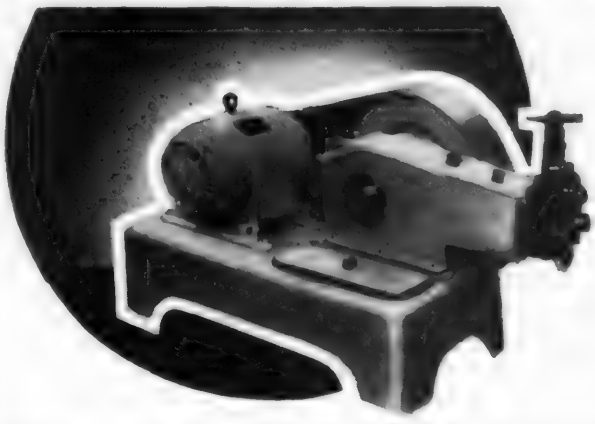

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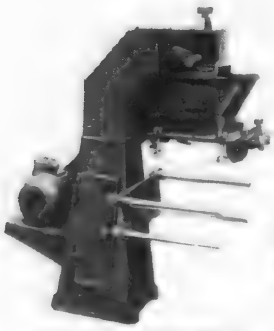

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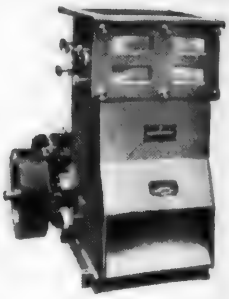

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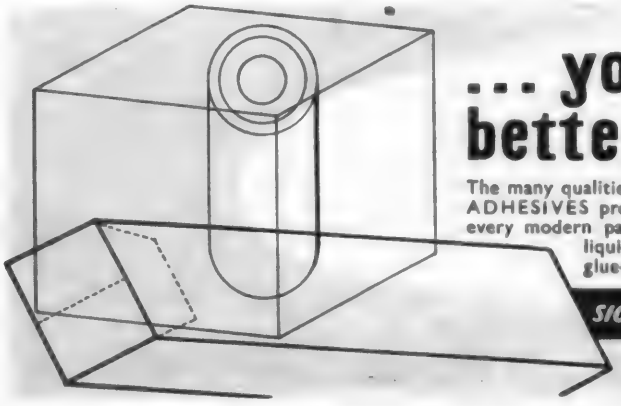

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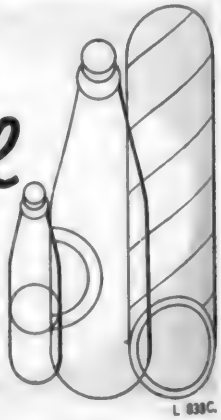

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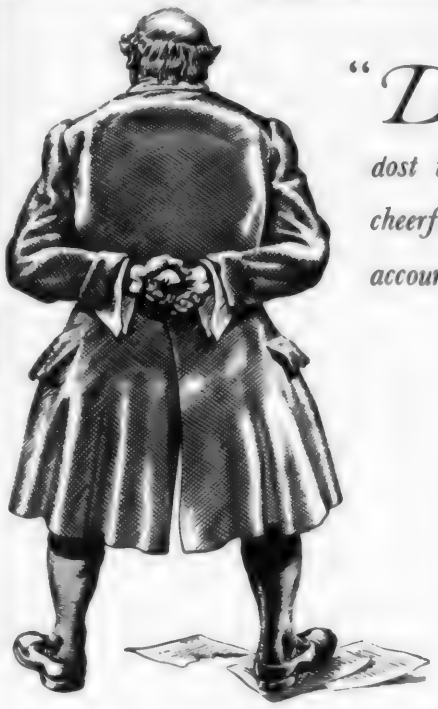

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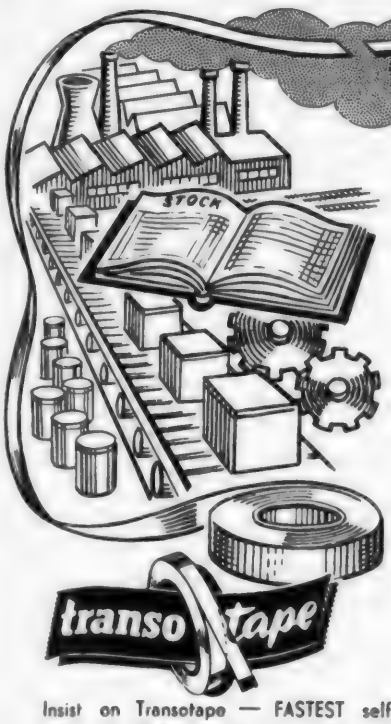

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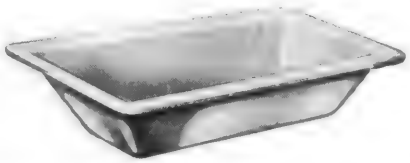

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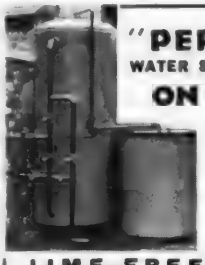

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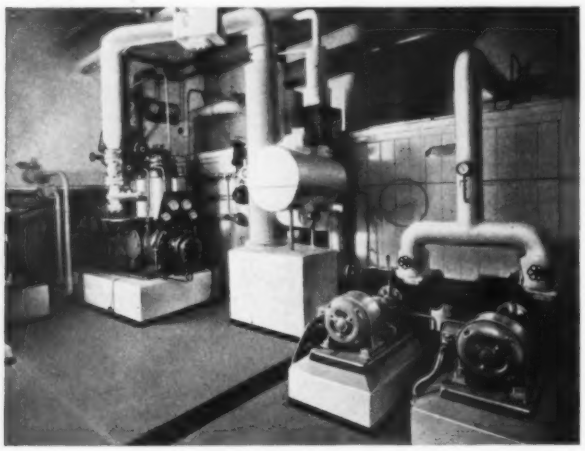

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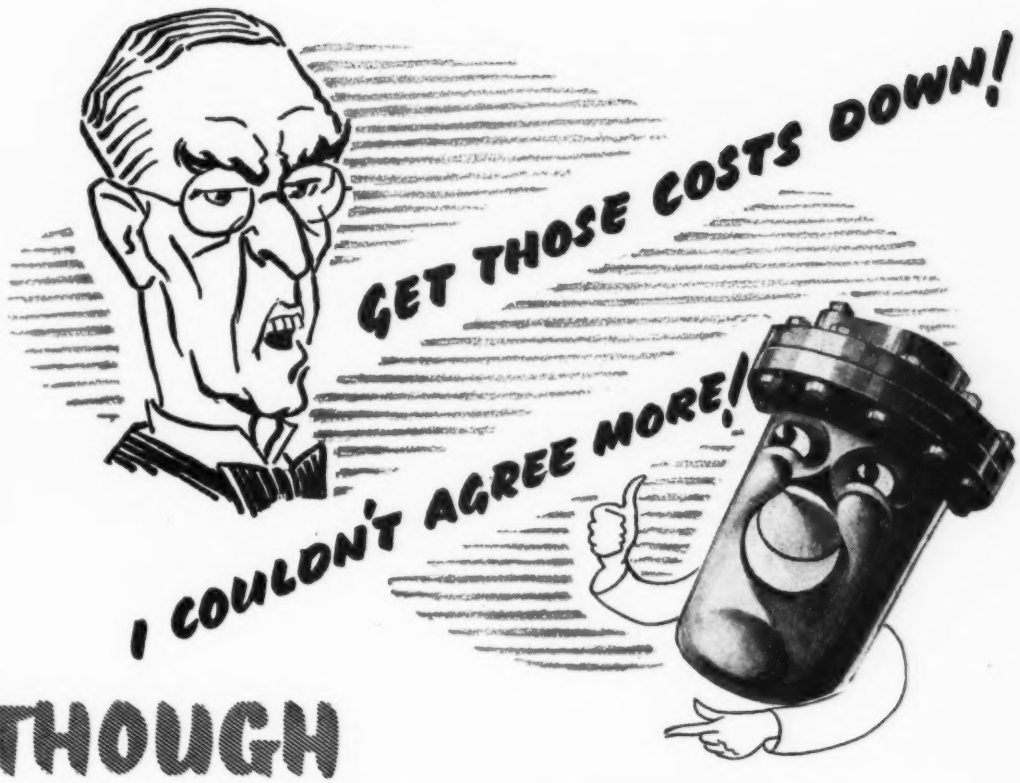

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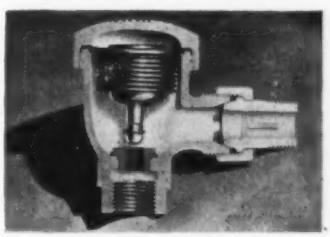

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